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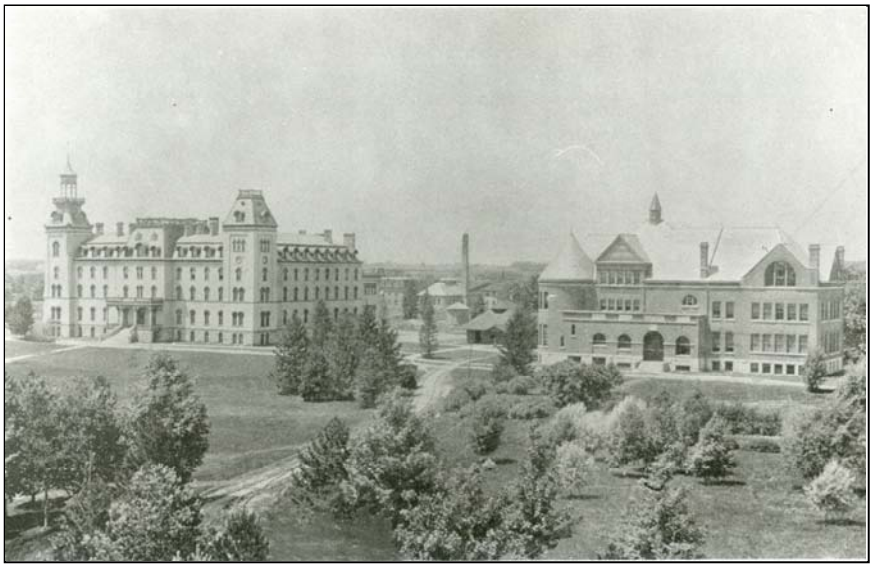

A QUARTERLY JOURNAL OF HISTORY

In This Issue

DOUGLAS BIGGS, associate professor of history and associate dean of the College of Natural and Social Sciences at the University of Nebraska–Kearney, recounts the story of the Ames & College Railway, popularly known as "the Dinkey," in the 1890s. He argues that the Dinkey played a crucial role in linking Iowa Agricultural College and the community of Ames.

KARA W. SWANSON, associate professor in the School of Law, Northeastern University, describes the origins of frozen-sperm banks at the University of Iowa in the 1950s. She focuses on clarifying the technological advance this step represented in the long history of "test tube babies." She also addresses the ethical controversy surrounding the technique and the strategies the Iowa scientists employed in the face of that controversy.

Front Cover

As students and visitors riding the Ames & College Railway—popularly know as "the Dinkey"—approached the Iowa Agricultural College campus in the 1890s, this, roughly, is the impressive view that they saw. For more on the Dinkey and its role in linking the college and the community of Ames, see Douglas Biggs's article in this issue. Photo from *Fifteenth Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm Made to the Governor of Iowa for the Years 1892 and 1893* (Des Moines, 1893).

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A QUARTERLY JOURNAL OF HISTORY FOUNDED IN 1863

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Book Reviews and Notices

Forging a Community with Rails: Ames, Iowa Agricultural College, and the Ames & College Railway, 1890–1896

DOUGLAS BIGGS

USING RAILROADS to build or supplement the growth of urban communities was a common practice throughout the world in the last quarter of the nineteenth century. Paris, London, New York, Boston, Philadelphia, and other great cities used street railway systems to join their suburbs to the city center, which facilitated every aspect of economic and social life in the great urban environment. This was no less the case in the Midwest, where metropolises like Chicago as well as mid-sized cities like Omaha/Council Bluffs and Des Moines likewise used railways to join their suburbs to the city center.[1] But the transformation of a small community by a local railroad could be just as significant, on a smaller scale, as shown by the impact of the Ames & College Railway (A&C) on Ames, Iowa, in the 1890s.

I would like to thank the staff at the Iowa State University (ISU) Library's Special Collections Department for their help when I conducted research for this article. Especially, I would like to thank Becky Jordan, who pulled many archival boxes for me and discussed issues at length. I would also like to thank my friend K. G. Madison, professor emeritus of history at ISU, for discussing the material herein. Last, and not least, I wish to thank my wife, Gloria Betcher, from the ISU English Department, who helped me form ideas and hone my argument.

1. E. Bryant Philipps, "Early Street Railways of Council Bluffs," *Iowa Journal of History* 48 (1950), 121–32; W. F. McGlothlen, "Des Moines Street Transit," *Annals of Iowa* 31 (1952), 225.

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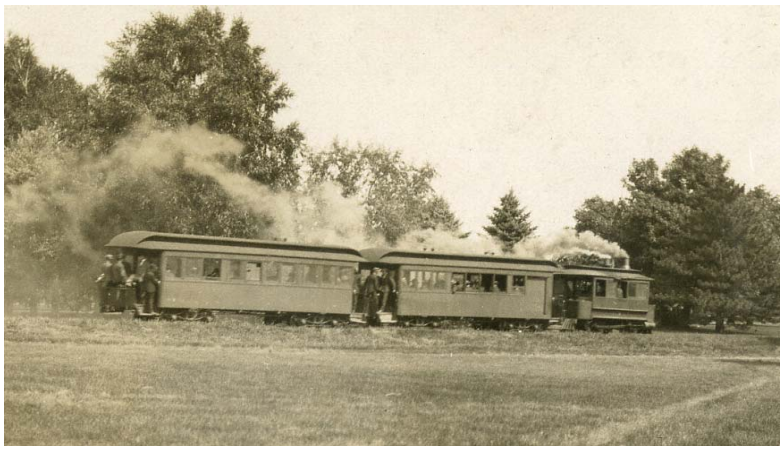
Looking west on Boone Street from a vantage point near the north end of Ash Avenue in 1909, one can see that the condition of the roadway is questionable at best. There is nothing to suggest that road conditions were any better 20 years before this photo was taken. The tree-covered hill to the right is where the ISU Memorial Union now stands. Photo from Farwell Brown Photographic Archive, Ames Public Library.

Before the construction of the A&C in the first months of 1891, the city was separated from the Iowa State Agricultural College (IAC), two miles to the west, by the broad, shady bed of Squaw Creek. Prior to the building of the A&C the only link between IAC and Ames was Boone Street, a mud track with a rickety bridge that became impassable during periods of heavy rain or snow.[2] Although the main line of the Chicago & North Western Railway (C&NW) ran hard by the northern edge of IAC, failed negotiations between the college and the C&NW in the 1870s and 1880s proved that the railroad would not build a new station or even a spur line to an agricultural college that had fewer than 300 students.

It was not until 1891, when the locally owned and operated Ames & College Railroad, or the Motor Line, built a steam locomotive service initially with only one, small, steam-dummy en-

2. "As an example, this spring (1892) the [Squaw] Creek rose, in less than 48 hours, to such a height as to cover the entire bottom land, and did great damage by its washouts on the highway [Boone St.] and the motor line." George S. Foster, "Design of a Stone Arch Bridge across Squaw Creek, on C&NW RR One Mile West of Ames" (unpublished undergraduate thesis, Iowa Agricultural College, 1892), 3.



In this undated photograph, the Dinkey, hauling the "immigrant car" and one of its two regular passenger cars, steams across the park heading for downtown. Note the passengers standing on the platforms and on the stairs. Photo from Special Collections, Iowa State University Library.

gine and two passenger cars, that the communities of Ames and IAC were linked. The diminutive size of the engine and the cars, coupled with the fact that the train was slow, underpowered, and usually overcrowded, led IAC students and townspeople to derisively refer to the train as "the Dinkey," and the name stuck. The first and only reliable rapid transit link between IAC and Ames until Boone Street was paved after World War I, the steam Dinkey made round trips from 1891 to 1907, before it sold out to the larger electric interurban railway, the Ft. Dodge, Des Moines & Southern, which replaced the steam locomotive with an electrified streetcar.

For a brief period, however, between 1891 and 1896, the Ames & College Railway had a significant impact on the citizens of Ames and the students of IAC. Those early years saw the railroad's founding and development but also the shaping of the community of Ames. After 1896, technological and progressive reforms in the city of Ames, such as electricity, an improved water and sewer system, and a new C&NW depot, rendered the once transformative Motor Line obsolete. Still, local

Ames historians have long noted the Dinkey's central place in uniting the town with the college and in forging one community.[3]

This article will examine the first five years of the A&C's operations, focusing on three points. First, the A&C came about through a confluence of student and capitalist effort, led by Judge John Loomis Stevens, an alumnus of IAC's first graduating class of 1872. Even though the investment group did not possess the resources to build the electric street railway that he wanted, Stevens would not be defeated. Through sheer force of will, he pursued his dream with dogged determination; he purchased used steam equipment, which was all his company could afford, and convinced a skeptical IAC board of trustees that his plans would succeed.

Second, building the Motor Line had an immediate and profound impact on both Ames and IAC. Since the founding of both entities, they had been two communities, but the Motor Line transformed them into one community. The Dinkey allowed students and faculty to live in town and commute to the school. Townspeople could attend college lectures and performances in large numbers, while students could travel to town to purchase goods from Ames merchants. Thus, the A&C brought IAC to the world and the world to IAC, and Ames rapidly became a "college town."

Third, contemporaries recognized the role of the Motor Line within their community. IAC students wrote about the Dinkey in their yearbook, *The Bomb*. The little train made its way into their poetry and faux plays, along with figuring prominently in their retrospectives. Townspeople, too, clearly understood that the A&C formed the glue that held their community together, becoming an indispensable part of their world. "Without the Dinkey," one contemporary Ames citizen observed, "everything would stop."

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3. William Orson Payne, *History of Story County: A Record of Settlement, Organization, Progress and Achievement,* 2 vols. (Chicago, 1911), 1:486–87; Gladys Meads, *At the Squaw and Skunk* (Ames, 1955), 142; Farwell Brown, "Ames' First Depot," in *Ames: The Early Years in Word and Picture: From Marsh to Modern City* (Ames, 1993), 19–23; idem, "When the Railroad Depot Was the Grand Portal to Our City," ibid., 170; idem, *Ames: A Ride through Ames on the Dinkey* (Charleston, SC, 2001).

CONTEMPORARIES UNDERSTOOD the need for reliable rapid transit to and from IAC almost immediately after the first students arrived on campus in the autumn of 1868, but a number of economic, political, and geographical obstacles stood in the way of achieving that goal. The model farm and agricultural college were platted in 1858 on the high prairie in the western part of an isolated and sparsely populated part of Story County.[4] When John Insley Blair brought his Chicago & North Western Railway's main line through the central part of the state in 1864, he wanted to place a station near the college, but Blair was not willing to pay the prices local landowners demanded, so he built his station, which he named in honor of his friend Congressman Oakes Ames, roughly two miles to the east of the college in the swampland near the confluence of the Skunk River and Squaw Creek.[5] In the succeeding years, although the C&NW main line ran tantalizingly close to the northern border of campus, repeated negotiations between the railroad and the college demonstrated that the C&NW had no interest in building a station at the college or even constructing a spur line to deliver goods and students.[6] Thus, the college remained a tiny community isolated on the high prairie two miles west of Ames separated by the Skunk River.

If the college found itself all but alone, Ames Station—or "Ames," as it soon became known—lay in a sort of "no man's land" between two larger communities. Fifteen miles to the east on the C&NW main line was Nevada, the county seat, with the courthouse, the only newspaper in the county until 1877, and a thriving business district. Roughly 15 miles to the west of Ames, across the Story County line, was the bustling community of

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4. The college and model farm originally comprised 648 acres of prairie. It was located in the western part of the county because Boone County had put up a significant portion of the funds to purchase the land and because Nevada (the county seat of Story County and largest town in the county) did not really want the college physically nearby. Payne, *Story County,* 1:15–16; Earle D. Ross, *A History of Iowa State College* (Ames, 1942), 27–29, 167.

5. Farwell Brown, "Ames' First Depot," 19–23.

6. In May 1882 IAC's board of trustees ordered President A. S. Welch to close on negotiations with the C&NW on the construction of a spur line that would link IAC to the company's main line. Board of Trustees, vol. 3, May 2–5 and May 23–26, 1882, Special Collections, Iowa State University Library.

Boone. It sat on the eastern edge of some of Iowa's richest coalfields, was the county seat of Boone County, and served as a major repair center for the C&NW. Ames's growth and viability were compromised not only by its location, but even more by the land on which it stood: bottom land that did not endear the little town to its early residents, who noted that the town's streets were more often sloughs than thoroughfares and that the C&NW station resembled a line shack more than a depot.[7] The city council's failure to curtail chickens and dogs roaming free in the town did little to inspire hope that Ames would attract many new residents or be anything much more than a stopping point for Blair's trains to take on water and coal.[8]

Although the City of Ames and IAC were each keenly aware of the other's presence in the 1860s and 1870s, the first regular transportation service between the college and the city did not appear until August 1874. A horse-drawn bus ran three return trips to campus per day, but was uncomfortable, unreliable, and expensive at 10 cents per ride. The service could be interrupted for days or even weeks at a time when heavy rains or snows made Boone Street impassable. Contemporaries considered the bus service better than nothing, but even the addition of a second bus in the 1880s could not provide the college with the transportation and freight services that it needed.[9]

Throughout the 1880s, as IAC's enrollment grew to nearly 300 students, the administration faced calls from the faculty and the student body to build or contract for a regular and reliable mode of transit between the city and college. All parties agreed on the necessity to improve the transportation system, but in

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7. Payne, *Story County,* 1:324–28; Brown, *Ames: The Early Years*, 14.

8. An ordinance restricting dogs running loose was approved on May 2, 1870. City of Ames, City Council Minutes, 5/8/1870, book 1, part 1, p. 35. A similar ordinance in regards to chickens running loose received unanimous council approval on May 15, 1871. City of Ames, City Council Minutes, 5/15/1871, book 1, part 1, p. 85.

9. Payne, *History of Story County*, 1:437. The *Aurora,* August 1874, noted briefly and simply, "Here at Last! The new college bus." The bus continued to run long after the Motor Line was established in 1891. As late as 1893, student groups rented the bus to go between campus and town. *Ames Times,* 10/5/1893. Later that same month Billy Childs, the owner and operator of the bus, was seriously injured when he was kicked by a horse. *Ames Times,* 10/19/1893.

spite of much talk no one could find a workable solution to the transportation problem.[10] Internal difficulties in both communities were largely responsible for the inability to build a better transportation link between IAC and Ames in the 1880s. IAC underwent a series of internal crises throughout the decade and went through five different presidents between January 1881 and January 1891.[11] The town, meanwhile, had seen some promising progress in the first half of the decade, but then suffered three devastating fires in 1886 and 1887 that destroyed nearly the entire business district. Thus, all available capital in the local banks and energy from Ames capitalists were tied up in rebuilding the downtown.[12] Finally, in the spring of 1890 a timely confluence of IAC student energy and the vision of an alumnus from IAC's first graduating class provided the will to build a rail link between the college and city.

IN THE AUTUMN OF 1889, two junior electrical engineering students, J. A. Bramhall and C. D. Davidson, proposed a joint senior thesis topic that ended up serving as a feasibility study for the construction of an electric railway between Ames and IAC. In the 1880s electric railways were still in their infancy. As with all new technology, electric rail systems were expensive and the technology could be tetchy. Notwithstanding the cost or difficulties, smaller Iowa towns strove to bring the status symbol of electricity to their street railways throughout the 1880s. Fort Dodge's experience exemplifies how difficult electrifying a street railroad could be. Even though Fort Dodge, 60 miles north-

10. As early as 1880 faculty were petitioning the college trustees to provide better transportation for the faculty who lived in town. Ross, *History of Iowa State,* 168. The authors of an 1890 study of the potential for a rail link between the town and the college stated that they selected their topic because "the question of quick and efficient communication between Ames and the college, is one that has occupied the thoughtful attention of the college trustees, faculty, and business men of Ames for several years," though "in a vague and uncertain way." J. A. Bramhall and C. D. Davidson, "Electrical Railroad between Ames and the College" (undergraduate thesis, Iowa Agricultural College, 1890), 1.

11. Ross, *History of Iowa State,* 122–24. For a more detailed account of the issues within IAC in the 1880s as it related directly to the teaching of agriculture, see John Boyd Hungerford, "Sketches of Iowa State College," Special Collections, Iowa State University Library, 143–49.

12. Meads, *Squaw and Skunk,* 117–18.

west of Ames, had a population of over 4,800 in 1890, the town did not possess the economic resources necessary to achieve the goal of an electric railway until 1896.[13] As Carl Condit suggests, electric railroads "were feasible only in areas of the highest population, traffic and commercial density."[14] Ames, with a population of only 1,276 in 1890, did not have electricity in the town and was not financially able to build an electric plant until 1896. Thus, what the students proposed was a very ambitious scheme that generated excitement on campus and in town.

The junior class of civil engineers became involved in the project by performing the survey work for the route of the proposed railroad. The students surveyed the route across campus and through the Squaw Valley, where they proposed to build three bridges: one in iron to span the Squaw Creek main channel, a second to cover the back channel, and a third to cross a small estuary that fed the creek. The route then proceeded east to Ames through the heart of the business district and terminated just north of the C&NW depot. This 1.98 miles of rail would link the heretofore isolated college to the rest of the world.

Conscious that their railroad would need to deliver freight to the college and model farm, Bramhall and Davidson adopted a standard gauge. This forced certain expenses on them, but they found several creative ways to keep the total cost down. First, they proposed buying only one engine and two passenger cars. Because they estimated that their train would carry no more than 10,000 passengers annually, they proposed running the railway on only a part-time business, roughly 230 days a year, to help keep costs down. The students also envisioned a part-time board of directors and a part-time business manager and suggested that employees would be necessary only when the train ran.[15]

The alumnus and self-styled progressive who provided the capital and the will to execute Bramhall and Davidson's plan

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13. Albert Butts, *The Story of the Fort Dodge Street Railway System* (Webster City, 1981), 10. As Butts demonstrates, although the city purchased some of the equipment necessary for the electric line in 1894, costs kept the city and investors from completing the line until 1896.

14. Carl Condit, "The Pioneer Stage of Railroad Electrification," *Transactions of the American Philosophical Society* 67/7 (1977), 7.

15. Bramhall and Davidson, "Electrical Railroad."

was Judge John Loomis Stevens. The railroad business ran deep in the Stevens family. John's father had worked for the railroad all his adult life, and John himself had briefly worked for railroads after graduating from IAC in 1872 before turning to the law in the mid-1870s. He settled in Ames, opened a legal practice, involved himself in city government, and then became a circuit judge in 1886.[16]

Exactly what moved Stevens to take notice of Bramhall and Davidson's work is unknown, but perhaps the catalyst for his keen interest was the visit to Ames by a Davenport company seeking to build an electric railroad between Ames and the college.[17] The city of Ames and its citizens disliked what they termed "foreign companies" descending on the community, establishing businesses, and taking profits out of town.[18] Stevens shared his fellow citizens' biases, so the visit from the Davenport street railway company might well have moved him to action.

Whatever the case, Stevens, seing the potential to capitalize on the students' project, helped Bramhall and Davidson with their research by paying for various things out of his own pocket with an eye toward eventually building the railway the students proposed. Stevens quickly realized, however, that funding the project beyond the research phase lay beyond his personal means. To share the cost of building the railroad, he organized three fellow IAC graduates into a group of investors and in September 1890 incorporated the group as the Ames Street Railway Company, which eventually became the Ames & College Railway.[19]

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16. For a fine biographical study of Stevens, see Suzanne Caswell, "John Loomis Stevens: A Biographical Sketch," *Trail Tales: The Journal of Boone County History* 109 (2008), 17–40.

17. *Ames Intelligencer,* 5/15/1890. Davenport reached a population of 27,000 in 1890 and had established an electric railway system in 1888. William Thompson, *Transportation in Iowa: A Historical Summary* (Des Moines, 1989), 116.

18. In a letter to the editor in the *Ames Times,* a citizen wrote that he disliked the idea that a "foreign company" would have to come in with the resources necessary to provide electric power, but the writer agreed that there seemed to be no alternative. *Ames Times,* 2/28/1895.

19. The A&C reported September 9, 1890, to the Railroad Commission as the founding date of the railroad. *Nineteenth Annual Report of the Board of Railroad Commissioners for the State of Iowa for the Year Ending, June 30, 1897* (Des Moines, 1897), 183. The articles of incorporation were signed in Boone before George Crooks on September 20, 1890, and filed with Story County on October 7, 1890.

The prospect of an electric railway connecting the college to the city generated a good deal of coverage in the local newspapers in the autumn of 1890. In spite of the enthusiasm and Stevens's progressive desires, however, the four initial investors in the A&C found the cost of building and operating an electric railway far beyond their means. Stevens would not be deterred, however. He was far too shrewd a businessman to let slip that he could not afford an electric railroad. Any such admission would have dampened community support.

Although the A&C proposal allowed the city and college media to tout a new electric line, Stevens never revealed the specifics of his plan in official negotiations. In September he sought a license from the city council to run his railway—powered by electricity, steam, or animal power at the company's discretion—down Ames's streets. The city agreed to his proposal, approving Ordinance #94 with alacrity in October after only two readings. The city council also gave the A&C a 30-year monopoly on operating a street railway in Ames.[20]

Convincing the city to give the A&C the right to construct its road and give it right-of-way to run trains along Ames's streets proved easy in comparison to obtaining similar permission from

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Story County, Iowa, Recorder's Office, Misc. Book 8, pp. 585–89; Brown, *The Early Years,* 42n. On November 24, 1890, Stevens sent a copy of the articles of incorporation to Secretary of State F. D. Jackson, asking him to file the articles with the state and bill him for the charges. Six days later, on November 30, Stevens duly sent a check for $7.10 for filing fees. Author correspondence with State Historical Society of Iowa, Des Moines. The articles were copied into the Secretary of State's records on December 3, 1890, and the originals were returned to Stevens by mail on December 12. Secretary of State, Iowa, Book D-2, pp. 303–6, State Archives, State Historical Society of Iowa, Des Moines. The other original investors in the A&C were Robert J. Hopkins, Richard Jordan, and Joseph Whitaker. Hopkins, from nearby Madrid, graduated from IAC in 1881 and was a banker as well as clerk of court for Stevens from 1888 until his untimely death in 1893. Goldthwait, *A History of Boone County,* 2 vols. (Chicago, 1914), 1:231; Elizabeth Tiernan, *Iowa State College Graduates: A Biographical Dictionary, 1872–1889* (Ames, 1939), 28. Jordan, who graduated from IAC in 1877, was a Boone attorney. Goldthwait, *History of Boone County,* 2:91; Tiernan, *ISC Graduates, 1872–1889,* 16. Whitaker, who graduated from IAC in 1874, was a Boone attorney and lifelong friend of Stevens. Goldthwait, *History of Boone County,* 2:48–51; Tiernan, *ISC Graduates, 1872–1889,* 8; *Ames Daily Tribune,* 10/26/1933.

20. Ames City Council Proceedings, 1880–1891, book 1, part 2, pp. 265–70. See also *Ames Intelligencer,* 10/23/1890.

IAC. In November 1890 Stevens presented the trustees with a proposal very different from the one he had presented to the city council; he now proposed a horse-drawn railway to connect the college and the city. The trustees, unmoved by civic enthusiasm or student research, were skeptical of the enterprise. Simply put, they did not believe that the investors possessed sufficient capital to successfully build and operate such a business.[21] The trustees also considered a horse-drawn railway insufficient to meet the college's transportation needs.[22] Despite the rebuff, the trustees agreed to continue a dialog with Stevens concerning his proposal over the holiday season of 1890–91. The substance of the dialog in those weeks is lost to us, but a couple of important things happened. First, Stevens broadened his investor base by selling shares of stock in the company to important college and city folk. Second, as the investors could not afford electricity and the IAC trustees would not allow them to use animal power, they turned to steam as the source of motive power.

By 1890, steam was fast being replaced by electricity in street railway systems, but if Stevens wanted his dream to become a reality, steam was the only source of motive power that the A&C could afford and that the trustees would accept. Perhaps nothing better demonstrates the undercapitalized nature of the A&C than the company's inability to afford anything more than one used engine and two used 32-foot passenger cars in the beginning, and it could only afford to lay 30-pound rails, which were not really sufficient for the task at hand. Not surprisingly, the A&C found that the rails often split, the trains often derailed if they went over 10 miles per hour, and the roadbed was in constant need of maintenance.

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21. It is an interesting irony that William McElroy served on the trustees' subcommittee to help create the Ames & College Railway in 1890 and was also instrumental in mandating changes that forced the A&C to sell itself to a larger railroad in 1905. In fact, it is Trustee McElroy's retrospective in 1905 that sheds light on the board's position on the A&C in 1890. Board of Trustees Reports, Book C, July 1903–January 1907, pp. 369–72, Special Collections, Iowa State University.

22. *Ames Intelligencer,* 11/13/1890. The board of trustees' records show that the date on which the trustees discussed the A&C's proposal was November 12. Board of Trustees, vol. D, May 1888–May 1894, p. 146, Special Collections, Iowa State University Library.

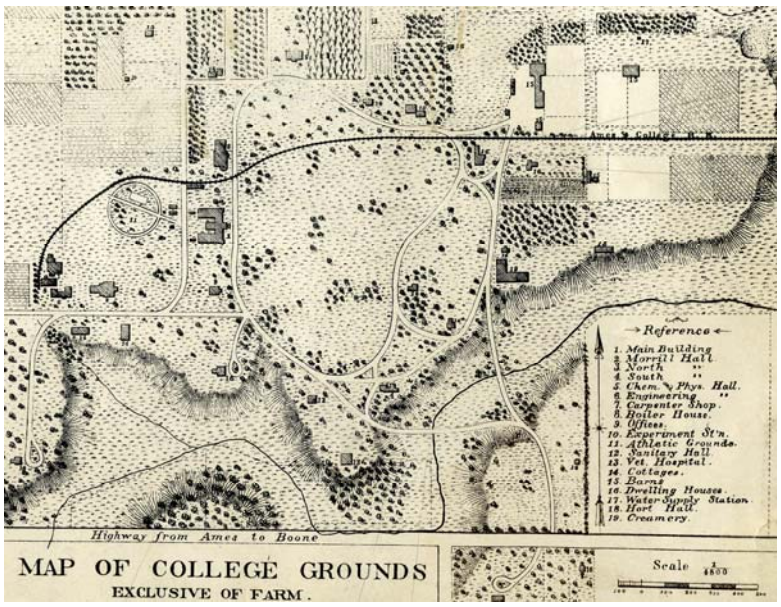
However obsolete, the little steam train gave students, faculty, and visitors a reliable transit between Ames and IAC. No matter how bitterly contemporaries complained about the train, they all agreed that the Dinkey was better than the expensive horse-drawn bus and far better than walking. An increased investor base and the decision to employ steam power convinced the trustees to give Stevens and his railroad a chance. In January 1891 they issued the first of a series of two-year contracts that gave the A&C the right to run its train across campus along a route already surveyed by Bramhall and Davidson, and gave the company a monopoly on freight and mail service to the college.[23]

Despite the terms of the agreement, Stevens soon found that IAC's new president wanted changes to the route across campus that he had helped Bramhall and Davidson survey. This rerouting of the tracks by William Beardshear, who became president of IAC in February 1891, was only the first indication of the deep impact the president would have on the A&C.[24] Even though the January agreement between the trustees and the A&C stipulated that the on-campus portion of the railroad follow the route already surveyed by Bramhall and Davidson, in May 1891 the trustees set a committee of the recently arrived President Beardshear along with professors D. W. Church and "Tama" Jim Wilson to determine a new route for the track on campus.[25] The president's committee followed the students' survey at first by taking the rails up the grade from the Squaw Valley between IAC's farmhouse and barns but then ran the

23. Board of Trustees, vol. D, May 1888–May 1894, 1/9/1891, pp. 159–60, Special Collections, Iowa State University Library.

24. Beardshear was born in Ohio in 1850 and had become president of Western College in Toledo, Iowa, before moving on to become the superintendent of public schools in Des Moines in 1889.

25. The trustees told the committee that they could change the route, "provided that the location of the new railway as it enters the campus proceed by what had previously been the north driveway of the college grounds." Board of Trustees Reports, vol. D, May 1888–May 1894, 5/14/1891, pp. 237–38, Special Collections, Iowa State University. The charge to the president's associates is printed in the *Fourteenth Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm Made to the Governor of Iowa* (Des Moines, 1891), 142. There is, however, no mention of it in Beardshear's annual report to the college trustees dated June 15, 1891, in folder 1/2, box 1, RS 2/5, William Miller Beardshear Papers, Special Collections, Iowa State University Library.



This campus map taken from the 1892 IAC Catalog clearly marks the Motor Line's route. Although it is shown as running all the way to a terminus at the Engineering Building, the track never made it much beyond the platform to the north of Main. The A&C ran off the map to the east across three bridges that spanned Squaw Creek and one of its tributaries on its way to downtown Ames.

track through the northern shoulder of the "park," as contemporaries referred to the large green space dotted with small groves of trees between the east front of Main and west of the Farm House (now called "Central Campus"), rather than on the northern fringe, where Bramhall and Davidson had planned it. Then it proceeded slightly to the south into the very heart of campus, where it terminated between Main and Morrill Hall, rather than behind Main as Bramhall and Davidson had planned.

The decision to change the route at this stage was not arbitrary. The president understood from the outset that the Motor Line would be much more than merely a train; it would be *the* vehicle that would deliver tens of thousands of students, alumni, and visitors to the campus in the coming years. For many of these men and women, their first introduction to college would be the view of campus from the A&C's cars as the train cleared

For about a decade this represented the view of the eastern face of the ISC campus. Main is on the left, with Morrill Hall on the right and the Hub (the campus terminus for the Dinkey) in the middle. The Dinkey line is in the center of the photograph running through the park towards the Hub. Although the picture is taken from the porch of the new Agricultural Hall (now Catt Hall), it gives some idea of the view of these buildings from the Dinkey as it cleared the farm and steamed for the heart of campus. This photograph is the frontispiece to the Fifteenth Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm Made to the Governor of Iowa for the Years 1892 and 1893 (Des Moines, 1893).

the college farm, and Beardshear intended for that first view of the eastern face of campus to leave a lasting impression.[26]

Beardshear's new route ensured that the visitors to his campus were treated to a striking view of the park, contrasted with the five-story Main, resplendent in her coat of white paint, and the rich red brick of Morrill Hall, both of which seemed to rise right up out of the prairie. The train finished its journey in between these two, and when the passengers alighted from the

26. Beardshear well understood the value of grand buildings. As he himself wrote, "Buildings and improvements talk without words." Special Report to the Trustees, 11/16/1897, box 1, RS 2/5, Beardshear Papers. D. A. Thornburgh, from the class of 1892, remembered how as a freshman he "marveled at the size of the 'old Main,' and drank in the beauty of that matchless campus." *The 1908 Bomb*.

cars, the two largest and most impressive structures on campus loomed over them. Many of those who came from farms and small towns to IAC in those years had never seen buildings this grand.[27]

With the route across campus determined, construction on the line began in April 1891. Even though Stevens had broadened his company's investor base, his railway remained an undercapitalized venture that could afford only a hastily built roadbed for the 1.98 miles of track, one used steam dummy engine, and two used street passenger cars. In spite of these shortcomings, the Motor Line began regular operations on July 4, 1891. For IAC's students, faculty, and staff, the city of Ames, which had been providing slow and unreliable transit service at the rate of ten cents per bus ride, was now only eight minutes away at half the cost. It is not surprising, therefore, to find that the two communities rapidly came together.

RIDERSHIP STATISTICS demonstrate just how quickly the A&C created one community and sustained what it had created. The founders of the railway had envisioned a part-time railroad that would carry perhaps 10,000 passengers per year. To that end the A&C began with a modest service. The first timetable for the Motor Line shows that the railroad ran only 11 trains per day Monday through Saturday with another 6 trains on Sunday. But it was soon clear that this level of supply would not meet demand. After only one week in operation with the first schedule, the A&C issued a revised timetable that nearly doubled service to 20 trains per day Monday through Saturday and 6 trains on Sunday. The first six months of operations exceeded

27. In spite of many modifications to Iowa State's campus, this part of Beardshear's vision of the college remains largely intact well over a century later. The view of what is now known as central campus from the western end of the farmhouse is still considered striking by students, alumni, and visitors alike, as well as being considered worthy of awards for design by national associations of landscape architects. For example, Thomas Gains, in *The Campus as a Work of Art* (New York, 1991), proclaimed Iowa State one of the 25 most beautiful campuses in the country. In 1999 the American Society of Landscape Architects selected central campus as a "Medallion Site" as one of the 300 most significant landscaped sites in the country. www.lib.iastate.edu/spcl/exhibits/150/template/campus.html (accessed 12/9/10).

all expectations. By the end of December 1891, almost 40,000 passengers had paid their nickel to ride the train, and by the end of the fiscal year, June 30, 1892, the total ran to over 77,000 passengers—nearly eight times what the founders had expected at the Motor Line's inception.[28]

Qualitative evidence complements the quantifiable evidence that the A&C was facilitating interchange between the two communities. One of the most significant experiments in community building in the first year of the Dinkey's existence was the creation of the Campus Choral Club under the direction of Elaine Chambers. In the August 6 edition of the *Intelligencer,* Chambers announced the formation of the Choral Club on campus, with its first meeting set for August 13. The announcement noted that "a number of ladies and gentlemen in Ames have expressed a desire to become members. Miss Chambers hereby extends them an invitation to do so." To help promote Chambers's effort to include community members in the Thursday night meetings, the Motor Line agreed to make two or three extra trips to campus on those Thursdays. The only stipulation was that at least 20 people needed to take advantage of the service to make the trips "sufficiently remunerative." These trips clearly brought in sufficient revenue, for stories and advertisements in the paper demonstrate that many townspeople headed to campus on Thursday evenings throughout the autumn of 1891.[29]

Just as the Motor Line carried Ames residents to IAC, it also carried students to downtown Ames, where they spent money in the local businesses.[30] In October 1891 the *Intelligencer* reported with its tongue firmly planted in its cheek that "some of the boys [at the college] say it would be cheaper for them if the motor would discontinue the night trips."[31] In November a

28. *Ames Intelligencer,* 7/16/1891, 7/23/1891, 1/14/1892; *Fifteenth Annual Report of the Board of Railroad Commissioners of the State of Iowa for the Year Ending June 30, 1892* (Des Moines, 1892), 671.

29. *Ames Intelligencer,* 8/6/1891, 8/13/1891, 9/17/1891, 9/24/1891.

30. To take only one example, contemporaries themselves noted how much money could be spent by students downtown on a spur-of-the-moment basis. In recounting the most important events of the year, *The 1894 Bomb,* 149, noted that on May 5, 1894, several students, being "heavy of pocket and light of foot," went into town, danced the night away, and returned to campus much poorer.

31. *Ames Intelligencer,* 10/8/1891.

group of students with a band from the college came to town and held what the paper described as an "impromptu Republican meeting" at the home of Captain Wallace Greeley, the town's most prominent Republican.[32] Perhaps the most significant indicator of the Motor Line's impact on the town and college is that by October 1891 both the *Intelligencer* and the student newspaper, the *IAC Student,* stopped reminding their readers that the Dinkey would be carrying passengers to city and college events; within four months the novelty had become an accepted part of the community.

In addition to carrying passengers to visit the town or the college, the A&C also helped to ease the overcrowded conditions of student housing on campus. As far back as 1886, ISC President William Chamberlain had pressed the legislature for funds to build new dormitory space on campus to alleviate overcrowding. At that point all of the students were housed in Main, which had originally been designed to house the president, the faculty and their families, and only 100 students. This initial design proved inadequate and had been amended by 1865 to house 162 students. The addition of new wings in 1872 further increased Main's dormitory capacity to 350 students. But by 1891 the student body had reached 425 with no downturn in sight, forcing the college to amend its housing policy and allow students to live off campus. Since IAC's inception, its policy had required all students to live on campus, but the presence of the Motor Line allowed increasing numbers of students to live downtown, thus alleviating the overcrowded conditions on campus. In 1895 the college built Margaret Hall, the women's dormitory, and renovated Main, allowing the college to house about 500 students. Even so, many IAC students continued to live in town and commute to campus daily.[33]

The men who governed the city had understood the importance of the A&C from its inception. In the last months of 1892, as the little train became the backbone that joined the city to the college, they decided to extend the city limits to the west and annex the college to Ames. Throughout the autumn of 1892

32. *Ames Intelligencer,* 11/5/1891.

33. Henry Summerfield Day, *The Iowa State University Campus and Its Buildings* (Ames, 1977), 322–35, 337–38.

both Ames papers had been asking their readers to push the city council to annex the college into the city of Ames. Robert Armstrong of the *Times* wrote a brief editorial in the October 23 issue, noting the improvements on the IAC campus and commenting that "we want people to be here to educate their sons and daughters." On November 17 the *Times* stated the case for annexation in no uncertain terms: the college "rightfully belongs to us and this [annexation] would make us a city of second class in short order."[34] That is, bringing the college into Ames would add a substantial number of new citizens and increase the town's population so that Ames would rise to the status of a "City of the Second Class." As a result, more county dollars would flow into the city coffers, eventually allowing the city council to build a jail, levy bond issues to build or supplement existing water works facilities, and hire a town marshal.[35]

Throughout the autumn, Mayor Parley Sheldon worked through the process of annexing the college and a portion of the land around it. On November 22 the city council considered the issue and instructed the city attorney to take the necessary steps to secure the annexation. On December 5 the council resolved to put the question of annexing the college and the land around it to the electorate in a special election that would take place on December 31. Mayor Sheldon's announcement of the election went in the Ames papers on December 8, and both papers urged their readers to support the resolution. One last salvo of media support came in the December 15 edition of the *Times,* which noted that the extension of the city limits would bring two miles of railroad inside the incorporated city limits, "the taxes from which would be no small matter."[36]

As things turned out, the newspapers need not have spilled so much ink on the issue. When the votes were counted, 3 ballots were termed as "lost," 9 men voted no, and a whopping 129

34. *Ames Times,* 10/23/1892, 11/17/1892.

35. The definitions, duties, and responsibilities of first-class and second-class cities were contained in statutes that had been passed by the state legislature in 1888. *McLain's Annotated Code and Statutes of the State of Iowa,* 4 vols. (Chicago, 1888), 1:197–200.

36. City of Ames, City Council Minutes, book 1, part 3 (1891–1901), 45–48; *Ames Times,* 12/8/1892, 12/15/1892; *Ames Intelligencer,* 12/8/1892.

votes were cast in favor of annexing the college to the city of Ames. In November 1893, when the secretary of state's office censed Ames's population to certify its status as a "City of the Second Class," it found 2,489 people in the city, including IAC's 620 students. That put Ames comfortably above the 2,000 population necessary to achieve such a status.[37]

Annexation increased the strength of the bond between the city and the college, and all three—Ames, IAC, and the A&C—facilitated that growth and profited from it. The railroad experienced no decline in demand for its service, carrying 77,000 passengers in the 1891–92 fiscal year. That number increased to 98,000 the next year, when the A&C continued to run 20 trains per day Monday through Thursday, but expanded its timetable to 24 on Friday and Saturday (with only 4 on Sunday). Although the economic downturn known to contemporaries as the Panic of 1893 affected the Ames community, ridership on the A&C remained robust. On virtually the same timetable adopted in March 1893, ridership dipped to 71,000 in FY 1893–94 but rebounded to 78,417 in FY 1894–95 (see table). The A&C ran an average of 22 trains per day in those years but often supplemented its service with "special motors." In fact, "special motors" became so much the norm that the *IAC Student* noted in November 1894 that there had been one every night the previous week because there were 13 entertainments for college and Ames people.[38]

While the A&C based most of its business on passenger traffic, that only accounted for part of the company's income. The line had a monopoly not only on hauling the mail to campus twice per day, but it also held the monopoly on freight service. The trustees negotiated freight service as part of the contract with the railroad in 1891 at the flat rate of 25 cents per ton. In FY 1893–94 the Motor Line hauled over 8,000 tons of freight to cam-

37. City of Ames, City Council Minutes, book 1, part 3 (1891–1901), 48–53. Ames conducted a special census on October 30, 1893, and the findings were forwarded to the secretary of state. On November 13, 1893, the secretary of state sent an official memo to Ames codifying its position as a "City of the Second Class." State of Iowa, Secretary of State, 11/13/1893, Secretary of State's Office, Des Moines.

38. *IAC Student,* 11/6/1894.

TABLE

AMES & COLLEGE RAILWAY OPERATIONS SUMMARY, 1891–1896

	June–Dec. 1891	1891–92	1892–93	1893–94	1894–95	1895–96
Income						
Passenger	$1,959.85	$3,857.35	$4,226.85	$3,549.45	$3,290. 85	$3,214.95
Mail service	…	…	$476.57	…	$749.85	$715.14
Freight	$441.55	$1,228.97	$1,309.00	$2,023.50	$1,308.95	$1,166.10
Other	$39.50	$51.50	125.99	…	$722.29	$594.17
Total Gross Income	$2,440.90	$5,137.82	$6,138.41	$5,572.95	$6,071.94	$5,690.36
Selected Expenses						
Repairs	$339.25	$453.47	$325.21	$293.65	$1,122.52	$409.93
Coal for Engine	$434.98	$949.13	$1,651.41	$829.97	$1,105.28	$1,161.98
Way and Structures	…	…	...	$293.65	$459.31	$435.31
Equipment	…	…	…	…	$72.00	$991.08
Other Expenses	$54.83	$515.67	$762.10	…	…	$201.92
Salaries						
Engineer	…	$600.00	…	…	$600.00	$624.60
Conductor	…	$540.00	…	…	$540.00	$553.60
Other salaries	…	$630.00	…	…	$600.00	$364.90
Total Expenses and Salaries	$829.06	$3,688.27	$4,508.72	$3,857.31	$4,549.11	$4,743.32
Net Income	$524.36	$1,449.55	$1,629.69	$1,715.64	$1,522.83	$956.04
Passengers carried[a]	ca. 40,000	ca. 77,000	ca. 98,000	ca. 71,000	78,417	ca. 64,299

SOURCES: *Ames Intelligencer,* 1/14/1892; *Annual Reports of the Board of Railroad Commissioners for the State of Iowa.*

[a]The estimated number of passengers carried was achieved by dividing the total passenger income by 5 cents (the cost of one ride). The lone figure that is not estimated was actually reported to the Railroad Commissioners by the railroad.

pus. In spite of the depression of the middle 1890s, when national unemployment figures reached an estimated 18.4 percent by 1894, those years saw IAC experience a building boom. Between 1892 and 1896 IAC added two new major structures to campus: Agricultural Hall (now Catt Hall) in 1892 at a cost of $35,000, and Margaret Hall, the women's dormitory, in 1895 at a cost of $45,000. The college also rebuilt its athletic grounds, laid 6,000 feet of sewer pipe connecting both new and old structures to the college sewage system, and renovated at least nine other structures on campus at a cost of more than $20,000. The Dinkey hauled the vast majority of the materials used in the building and renovations.[39] By 1892 the A&C found itself hauling so much freight that it added a second steam dummy engine to meet the demand for the college's freight traffic.[40]

Perhaps more importantly, reliable mass transit between the college and city also began to attract the notice of the outside world in the months and years following the Motor Line's founding. The *IAC Student* reported in September 1891 on the large number of people who visited campus "every day."[41] Many of the visitors were alumni, but farmers, businessmen, and parents of potential students visited campus as well. Most visitors knew where they were, but some visitors to campus seem to have been confused as to that fact. The *Student* reported one instance when a "young rural couple" traveling through

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39. Day, *ISU and Its Buildings*, 184–87, 337–38, 82. "The Pines" (now called Sloss House), a faculty residence, underwent repair and a remodel in 1894 (ibid., 176). The third floor of the East Boarding Cottage was completely remodeled in 1890 and the lower two floors in 1894 (ibid., 180–81). Both floors of the West Boarding Cottage were completely remodeled in 1894 (ibid., 181). A second floor was added to the Chemical and Physical Laboratory in 1891 (ibid., 202–3). The original College Creamery underwent a remodel in 1891 (ibid., 213). The "New" Creamery was built for $9,000 over 1891 and 1892 (ibid., 214–15). The English Office Building received an addition and remodel in 1892 for $4,000 (ibid., 235–36). The Experimental Barn was built for $4,000 in 1894 (ibid., 240–41), and North Hall was remodeled in 1894 and appended to Margaret Hall (ibid., 363). Some of the costs for remodeling and repair were not recorded, but the material for all of these projects was hauled to campus by the Motor Line.

40. *IAC Student,* 6/22/1892; *Ames Times,* 6/23/1892, 7/14/1892.

41. *IAC Student,* 9/9/1891.

Ames had taken the Motor Line to campus and made their way to Old Main thinking it a large hotel.[42]

Befitting IAC's position as an agricultural college, it soon began to host meetings of agriculturalists on campus that brought academics and agriculturalists together for the benefit of both. On April 13 and 14, 1892, IAC hosted the annual meeting of Iowa Sheep Farmers and Woolgrowers. The group was relatively small, and the two-day event went well.[43] The success with sheep encouraged the college to try its hand with dairy cattle; during the winter break from classes in 1892, IAC held the state dairy convention on campus for three days. The program featured some of the most prominent dairymen in the state, leading its organizers to expect a large audience. With the students gone home for winter break, most of the delegates stayed in rooms on campus, and the Motor Line served as the vehicle that brought the delegates from the C&NW depot to campus and sent them back again. During the conference the *Aurora,* the monthly IAC newsletter, reported that the Motor Line carried over 1,000 people in a 24-hour period. The *Times* gave the event substantial coverage, including speeches by notable dairymen and President Beardshear in its November 17 issue. The paper noted that a "mass of humanity" descended from the C&NW platform and was transported out to campus by the Motor Line. The report concluded with pride that the event was a great achievement for the city and the college. The dairymen echoed the *Times*'s assessment of the meeting, calling it "a pronounced success from opening to closing."[44]

The joining of the city and campus via the Motor Line made it possible for entertainers from the outside world to draw from both segments of the community. For example, John C. Lewis and his vaudeville troupe came to Ames on December 16, 1892,

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42. *IAC Student,* 3/22/1898.

43. The *Student* printed the two-day program in full and encouraged students to attend. *IAC Student*, 4/9/1892.

44. *Proceedings of the 16th Annual Convention of the Iowa State Dairy Association* (Waterloo, 1893), 10 and Secretary's Preface; *Aurora,* November 1892; *Ames Times,* 11/17/1892. The first meeting of the conference was held in the Morrill Hall auditorium, which seated 634, and the seats were almost completely filled. *Proceedings of the Dairy Association,* 9.

to perform his popular play, *Si Plunkard.* Lewis was a nationally known director and actor who spent more than 20 years touring the country with *Si Plunkard.* There is little doubt that Lewis's drama and comedy were written for and played to midwestern sensibilities; his success in spreading his work so far over space and time strongly suggests that the material contained in the production struck a chord with his audiences over the two decades that spanned the turn of the century. His Ames audience that snowy December in 1892 was no exception. To ensure that a college audience would be able to enjoy the entertainment, the A&C laid on a special motor that departed Ames for campus at 10:40 pm.[45] No one, it seemed, wanted to miss the fun.

CLEARLY, then, the Motor Line helped to forge Ames and IAC into a single community, but it is also worth noting that contemporaries understood and appreciated that transformation as well as the Dinkey's central role in the process. "The Motor," as contemporaries often called it, rapidly became a central feature in their lives and in the popular culture of the community. The train became a central character in many of their stories, plays, and poetry, and the A&C's employees became local celebrities. IAC students and townspeople perceived the Motor as a great improvement over what had been before and saw the railway as a symbol of progress in a progressive age. In its last issue for 1892 the *IAC Student* noted that the "motor line is one of the improvements having the greatest effect on the daily life at the college."[46] In January 1893 the *Times* ran a commemorative issue that calendared the great achievements in Ames within the past 18 months. Buildings and the new waterworks figured prominently in the list, but the paper listed the Motor Line as one of the most significant improvements in the town. According to the paper, the A&C was responsible for the economic boom that Ames had experienced over the preceding year-and-a-half.[47] Even in retrospect the Motor Line stood out in the minds of con-

45. *Ames Times,* 12/15/1892. See also William Slout, *Theatre in a Tent* (1972; reprint, New York, 2008), 7.

46. The *Student* also referred to the Dinkey line as a "modern railroad." *IAC Student,* 11/9/1892.

47. *Ames Times,* 5/1/1893.

temporaries. In 1897, for example, Anna Dean, from the class of 1892, reflected on how she came to campus as a freshman on the old bus but left it as a senior on the "motor car."[48] In November 1891, as IAC's first winter with the Dinkey closed in, President Beardshear noted in his annual report to the college trustees that "the completion of the steam motor railway connecting the college with Ames has greatly benefited our work. It places the college in a more intimate relation with the town and enables us to have mutual interchange in the interests affecting the town, college and State."[49]

The *Times* and the *Intelligencer,* along with the *IAC Student,* took a keen interest in all of the activities on the Motor Line, from its construction to the purchase of new equipment, even noting its performance in snowy weather. But perhaps more important, all of the attention the newspapers focused on the A&C transformed its employees into local celebrities. By far the most significant of these was Henry "Hank" Wilkinson.

Born in Illinois in August 1854, Wilkinson had come with his parents to Boone. He spent 15 years working for the C&NW before marrying Laura Baughman in 1890. Married life and the desire to start a family meant that Hank no longer wished to roam so far on the rails, so the couple settled in Ontario just west of (now part of) Ames. Wilkinson was a tall and robust man who was always quick to smile; he had a contagious sense of humor and made friends easily. His pleasant countenance combined with his willingness to help anyone in need earned him universal respect, and President Beardshear and his family counted him among their friends.[50] Contemporaries considered him honest and hard-working. He would see to the safety of nearly two million passengers over the 15 years he served as the conductor on the Motor Line.

The first mention of Wilkinson as conductor on the Motor Line comes from the *Times* on July 28, 1892.[51] Within months he

48. *The 1897 Bomb,* 143–44.

49. "Report of the President," *Fourteenth Biennial Report of the Board of Trustees of the Iowa State Agricultural College and Farm Made to the Governor of Iowa* (Des Moines, 1891), 7.

50. *I.S.C. Alumnus,* December 1914, 11–14.

51. *Ames Times,* 7/28/1892.

In his element, Hank Wilkinson, the redoubtable conductor of the Motor Line, stands on the platform of one of the cars in this photo from The 1905 Bomb.

had become a local celebrity. Over the next 15 years the Ames and student newspapers not only chronicled his exploits on the Motor Line; they also noted the birth of his children, reported on his hunting expeditions, took note of his ill health, and mourned with him in times of personal loss. Wilkinson cut quite a dashing figure on the Motor Line, and the *Student* could not help but be impressed. The paper noted that young men escorting their ladies to chapel all wished to display a "cool self confidence similar to that of 'Hank' boarding the motor."[52]

One of the most colorful episodes involving Wilkinson that the newspapers covered occurred in the autumn of 1893, when the *Times* reported on a race between the Dinkey and a cow. According to the paper, a lone cow from the IAC farm had somehow gotten out of her pasture and ended up

52. *Ames Times,* 7/28/1892, 4/12/1894; *IAC Student,* 4/8/1893, 4/9/1894; *Ames Intelligencer,* 4/12/1894. The *Times*, 3/2/1893, happily reported that Hank's wife had delivered an 11-pound baby boy, but noted that "Hank has no time to run the limited on the A&C Railway." When Wilkinson's daughter was born on September 4, 1894, the *Times* reported that as well, noting, "all hands getting along nicely." *Ames Times*, 9/6/1894. The *Times,* 12/28/1893, reported that Hank's 22-month-old son, John Clayton Wilkinson, had assisted his father on the Motor Line one day the previous week. The *Times,* 12/15/1892, reported tongue-in-cheek that "sportsmen need not go to the college farm in search of game, for all wild animals in their locality are extinct, largely due to the fact that 'Hank' Wilkinson and Wesley Sexton went hunting out there Tuesday." After serving for 15 years on the Dinkey line, Wilkinson moved on to work at the college. Tragically, he died during an accident while driving a truck for ISC in 1914. Meads, *Squaw and Skunk,* 36–37. Wilkinson's sudden and untimely death at the age of 60 received much coverage in the Ames and college newspapers. See, for example, *Ames Evening Times,* 11/20/1914, 11/23/1914.

near the track. As the train passed the cow on the way up to campus, the animal turned and began to run alongside the engine. As the paper told it, the race between cow and steam engine was a lengthy and closely run affair, but "Hank finally won the heat." After the race, the cow ended up in the wrong pasture, where students found her (apparently no worse for wear) the next morning.[53]

Contemporaries clearly noted and enjoyed the papers' coverage of Hank Wilkinson and his colleagues, but there were occasions when students and townspeople rubbed each other the wrong way. One incident that occurred in April 1895 played itself out in the newspapers. The *Times* reported in a lengthy piece that a group of college boys, "presumably freshmen," had come to town on the Motor and acted in a most inappropriate manner. The paper reported that the group came out from campus to the café at the C&NW depot and caused a ruckus by eating everything the café possessed, annoying the patrons by repetitious yelling of the college cheer, and engaging in "snatches of senseless doggerel, which was entirely uncalled for, and deserving of the severest censure." The *IAC Student* responded that, in an attempt to be "sensational," the *Times*'s college editor had presented a "pretty highly colored account" of what had actually transpired at the depot. The *Times,* the *IAC Student* suggested, should concentrate its reporting on the "good features of I.A.C., rather than fill up [its] columns with criticisms that are both offensive and unjust."[54]

The editors of the *Times* were not about to accept this version of events and in very un–*Times*-like language took what it called an "obscure college publication" to task for its temerity. The *Times* wrote that anyone who was acquainted with the events at the depot would, upon reading the story in the *IAC Student,* be led "to believe that there were several large orifices in the sky-piece of the worthy sage from whose facile pen it had emanated, and that he had better glue them up and talk through something else."[55]

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53. *Ames Times,* 10/12/1893.

54. *Ames Times,* 4/11/1895; *IAC Student,* 4/16/1895.

55. *Ames Times,* 4/18/1895.

Frustrations and frictions between townspeople and students notwithstanding, perhaps the most impressive aspect of the Motor's place in the minds of students is that it shared in the reflected pride that they felt in being students at IAC. In the 1895 *Bomb*, the junior class president, J. R. Davidson, penned a small piece titled "Iowa Agricultural College, Past and Present."[56] Davidson noted the physical and educational progress that the college had achieved since its founding. It is both instructive as to its impact and indicative of its central role in the life of the campus that the Motor was the rhetorical thread that held a significant portion of Davidson's narrative together. He ended his historical piece with a fictional journey of an imaginary alumnus returning to campus and reflecting on what he found. Davidson noted that in the old days a new student arriving at the C&NW depot would "wander aimlessly about until he found the college bus." However, Davidson continued,

> Those days have passed away. Now, the new student, as he alights from the car [i.e. the train at the C&NW depot], hears three shrill whistles which come from just northeast of the railway depot. The old students rush by him, and he is then made acquainted with the term "Motor starts in five minutes." He follows the crowd, and boarding the motor is conveyed to the college, where he alights at the neat motor depot, just north of the main building.

As Davidson's story moved on, his fictional alum walked in quiet amazement among the proud new buildings, beautiful park, well-kept athletic grounds, and "neat depot" (the Hub) until the shrill whistle sounded again signaling that it was time to board for the return trip to town. As the alum sat and looked out the window of the passenger car as the Motor chugged back toward town, he reached a "true conclusion. Iowa Agricultural College is a great institution."[57]

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56. J. R. Davidson was one of the editors of the *IAC Student* from its founding in 1892 and the president of his junior class. He is listed as an 1895 graduate, but unfortunately Elizabeth Tiernan could find no biographical information on him for her *Iowa State College Graduates: A Biographical Dictionary, 1890–1899* (Ames, 1952), 46.

57. *The 1895 Bomb*, 121–22. Alumni from the 1890s were no less impressed with the institution long after leaving IAC. D. A. Thornburgh (class of 1892) wrote in a letter to *The 1908 Bomb*, "What an education in itself to come into close, al-

THE YEAR 1896 brought the initial phase of the unified history of Ames and IAC to an end. In spite of the depression that had begun with the Panic of 1893, Ames was fiscally sound enough to levy a $12,000 bond issue to build an electric power plant that finally brought electricity to the city in 1896, and then went on to increase water and sewer services, in addition to negotiating to secure a new C&NW depot at the end of the century. In 1898 the college changed its name from Iowa Agricultural College to Iowa State College, and in the last years of the century it expanded rapidly, building new buildings and watching enrollment reach nearly 1,000 by 1900.

Yet the A&C, the backbone of the community and the catalyst for part of this growth, could not keep pace with technological progress. In January 1896 a near-fatal accident with a pedestrian on the Motor Line led to a lawsuit and a sizable judgment against the company.[58] The A&C appealed the decision to the Iowa Supreme Court, but the high court sustained the original verdict. Without insurance to cover the cost of the settlement, the burden of meeting the financial obligation imposed by the court fell directly on the shoulders of the investors. Thus, in the late 1890s the A&C could not afford to modernize its equipment to electric power, and updating the old steam equipment seemed to be a losing proposition in an age when electricity had replaced steam as the preferred mode of power for street railways, so the A&C continued to operate with increasingly obsolete and potentially dangerous steam equipment.

By 1904 the *ISC Student* began to print articles openly critical of the Dinkey as being outdated, small, slow, unsafe, and hardly a fit example of a progressive age.[59] In his report to the trustees at the end of that year, IAC President Albert Storms commented on the Dinkey's shortcomings. The following spring, the trustees began to reconsider their entire relationship with

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most intimate contact, with men such as Welch, Beardshear, Lincoln, Stanton, Hainer, Osborn and many others of almost equal power in classroom and in personality. As truly fortunate were the men and women who wrought in the 80's and 90's."

58. Allen v. Ames and College Railway, 106 Iowa 602, 76 N.W. 848 (Iowa 1898), 1–86.

59. *ISC Student,* 1/27/1904, 3/2/1904, 3/5/1904, 3/16/1904, 4/13/1894.

the A&C. Since 1903 the Fort Dodge, Des Moines & Southern Railway had been in negotiations with the city to run electric interurban service from Des Moines through Ames to Fort Dodge. Increasingly, it seemed to the trustees that the old A&C, with its outdated equipment, was no longer capable of providing ISC with the rapid transit service it needed. On March 8, 1905, the trustees formed a subcommittee to discuss the relationship between the A&C and the college. Meetings between the two took place over the summer, and on September 27, 1905, the subcommittee tendered its report to the trustees, who delivered an ultimatum to the company: either give up steam for electric or gasoline power or move the rail line to the north and away from the heart of campus.[60]

Estimated costs to electrify the Motor Line ran at nearly $80,000, a figure well beyond the ability of the A&C to capitalize.[61] Thus, the directors of the company worked throughout the autumn of 1905 and spring of 1906 to sell their corporation. In February 1906 the *Student* reported that the A&C had been sold to the Newton & Northwestern Railway (N&NW), an Iowa railroad backed by eastern moneyed interests that provided electric interurban service from Des Moines to other points within central Iowa. The N&NW was soon subsumed by the Fort Dodge, Des Moines & Southern Railway, which continued to operate the steam Dinkey while the new electric interurban rails were laid. At about 10:00 p.m. on Friday, September 6, 1907, the Dinkey made its final run from Ames to the campus and

60. President's Report to the Trustees, 12/23/1904, box 1, RS 2/6, Albert Storms Papers, Special Collections, Iowa State University Library; Trustees' Minutes, Book C, July 1903–January 1907, 3/8/1905, p. 247, and 9/29/1905, pp. 369–72, Special Collections, Iowa State University Library.

61. As they had in 1890, students in 1904 came forward to help try to find a solution. This time two groups of students wrote senior theses as case studies of how to electrify the Motor Line. Both studies estimated that it would cost nearly $80,000 to transform the Dinkey from steam to electric power. Arthur R. Buckley, Harold L. Scranton, and Earl O. Shreve, "Design and Specifications for Changing the Present A.&C.R.R. from Steam to an Electric Road" (undergraduate thesis, Iowa State College, 1904); Frank L. Brown and Lester Morris, "The Ames and College Belt Line" (undergraduate thesis, Iowa State College, 1904). According to the A&C's financial reports to the Railroad Commission for FY 1902–03, the railroad earned only $3,269.55 in net profit. *Twenty-sixth Annual Report of the Board of Railroad Commissioners for the Year Ending June 30, 1903* (Des Moines, 1903), 30.

back.[62] Over its 16-year lifespan it had carried over 2.1 million passengers the 1.98 miles to and from Ames and ISC.

BETWEEN 1891 AND 1896 Ames and Iowa State College became one community bound together by the Ames & College Railway. What began as an undergraduate senior thesis and a dream of John Stevens became the backbone that held a rapidly growing city and college together. It is hardly surprising that the little railroad, as the only viable alternative to walking or taking the horse-drawn bus, became so important so quickly. Over its first five years of existence the Dinkey carried no fewer than 356,000 passengers between the college (with an average student population of 545) and the city (with a population of about 1,800). The A&C brought the college to the world and the world to the college; and it enabled the college and the city to embark on a decade of unparalleled growth in terms of economics, mortar and brick, and population. Contemporaries understood and appreciated the significance of the A&C. The local media considered events on the Motor Line to be newsworthy and covered them with alacrity. While the frustrations associated with growth and change in the community sometimes played themselves out in the local media, townspeople and students alike took pride in their community's achievements, and the Dinkey played a significant part in their reflections. Even though the inexorable march of technology eventually rendered the Motor Line obsolete, for five years between 1891 and 1896 it helped to forge one community in Ames.

62. *ISC Student,* 2/24/1906, 9/9/1907; *Iowa Trolleys: Bulletin 114 of the Central Electric Railfans' Association* (Chicago, 1975), 97–100; George Hilton and John Due, *The Electric Interurban Railways in America* (Stanford, CA, 1960), 363–64.

The Birth of the Sperm Bank

KARA W. SWANSON

ON APRIL 9, 1954, the *Cedar Rapids Gazette* published a scoop. The front-page banner headline screamed, "Fatherhood After Death Has Now Been Proved Possible." The story announced the birth of three "history-making" babies.[1] The babies were conceived using semen that had been frozen and stored before use, a first in human reproduction. It was a local story, because the underlying research had been conducted just 30 miles away at the University of Iowa medical school in Iowa City.[2] The article described how two university researchers, zoology graduate student Jerome Sherman and professor of urology Raymond Bunge, had developed a technique of freezing and thawing human sperm while preserving viability. At the university hospital fertility clinic, three women had been successfully inseminated with previously frozen semen. The *Gazette* was the first media outlet to announce the births resulting from this new form of assisted conception.

By 1954, the technique of artificial insemination, the use of instruments to deposit semen within the reproductive tract of the intended mother at her estimated time of ovulation, had already resulted in the birth of thousands of children in the United

1. *Cedar Rapids Gazette*, 4/9/1954.

2. The University of Iowa was then called the State University of Iowa. Stow Persons, *The University of Iowa in the Twentieth Century: An Institutional History* (Iowa City, 1990), 181. This article uses the current designation.

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States.[3] The three Iowa babies represented another step in assisted conception, transforming the sperm bank from a futuristic dream into a viable part of reproductive medicine. Despite the *Gazette*'s provocative headline, there was no indication that any of the history-making babies had been conceived posthumously. What their arrival did show, however, was that those skilled in the new technique could create large collections of frozen sperm from donors near and far and make specimens available to prospective parents and their doctors for use in conceiving a child, perhaps even after the sperm donor's death. The ability to choose a biological father for an intended child was thus expanded in ways previously impossible when only fresh sperm from a locally available donor was used for insemination. The Iowa babies opened the door not only to "fatherhood after death," but also to "genius" sperm banks and today's mail-order sperm bank industry.[4]

Less dramatically, but perhaps of more interest to the involuntarily childless, the new technology also offered a way of improving the chances of assisted conception using sperm from the intended father, avoiding the need for a donor. Artificial insemination had often been tried to treat involuntarily childless couples, but using the intended father's semen was rarely successful, often because such men had low sperm counts. Doctors had tried different approaches to obtain the most concentrated specimen possible for use in a well-timed insemination, hoping to increase the odds of conception.[5] Freezing samples offered the opportunity to collect multiple specimens over time and to choose only the best to use for insemination when the intended mother was most likely to conceive, or to combine the most concentrated portions of several samples.

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3. Abner I. Weisman, *Spermatozoa and Sterility: A Clinical Manual* (New York, 1941), 168–70; Francis I. Seymour and Alfred Koerner, "Artificial Insemination: Present Status in the United States as Shown by a Recent Survey," *Journal of the American Medical Association* 116 (6/21/1941), 2747.

4. David Plotz, *The Genius Factory: The Curious History of the Nobel Prize Sperm Bank* (New York, 2005); Lisa Jean Moore, *Sperm Counts: Overcome by Man's Most Precious Fluid* (New York, 2007), 103; Cynthia R. Daniels, *Exposing Men: The Science and Politics of Male Reproduction* (Oxford, 2006), 91.

5. Wilfred J. Finegold, *Artificial Insemination* (1964; reprint, Springfield, IL, 1976), 17–18 (reviewing methods in use in 1950s).

All of these baby-making possibilities were set before the citizens of Cedar Rapids that spring. Despite the enthusiasm and persistence of the *Gazette* reporter, who followed the story for a year, the "history-making" Iowa research was not universally acclaimed.[6] Anticipating praise and professional glory, Bunge and Sherman instead found themselves the subject of criticism in Iowa and within the national medical community. Americans remained skeptical of assisted conception, after death or otherwise, and even fertility specialists distanced themselves from the Iowa breakthrough. It would be decades before frozen sperm would be fully incorporated into the practice of reproductive medicine.

THE IOWA BABIES, renewed proof of the ability to separate sexuality and reproduction, were the mid-century version of the "test tube baby," the popular term for the result of assisted conception that had been sparking enthusiasm, anxiety, and controversy for decades. In the first English-language book on the subject, *Test Tube Babies*, published in 1934, German physician Herman Rohleder traced the artificial impregnation of humans back to the late eighteenth century.[7] Following early reports by European experimenters, scattered American doctors had attempted artificial insemination, with husband and with donor sperm, with limited success.[8] By 1920, the elite physicians of the American Gynecological Society had begun to discuss the tech-

6. Coverage in the *Gazette* had begun on December 3, 1953, and continued through December 12, 1954. Both of these stories also appeared on page 1.

7. Herman Rohleder, *Test Tube Babies: A History of the Artificial Impregnation of Human Beings* (New York, 1934) (first published as *Monographien über die Zeugung beim Menschen*, Die künstlich Zeugung [Befruchtung] im Tierreich, vol. 7 [G. Theime, 1921]). For a later history of artificial insemination, in the context of a medical treatise, see A. M. C. M. Schellen, *Artificial Insemination in the Human,* trans. M. E. Hollander (Amsterdam and New York, 1957), 9–18. A more detailed historical analysis is in F. N. L. Poynter, "Hunter, Spallanzani, and the History of Artificial Insemination," in *Medicine, Science, and Culture: Historical Essays in Honor of Owsei Temkin*, ed. Lloyd G. Stevenson and Robert P. Multhauf (Baltimore, 1968), 97–113.

8. Eliza M. Mosher, "Instrumental Impregnation," *Woman's Medical Journal* 22 (1912), 223; Margaret Marsh and Wanda Ronner, *The Empty Cradle: Infertility in America from Colonial Times to the Present* (Baltimore, 1999), 66–67, 69–70, 93–94.

nique as a useful means of treating infertility.[9] As doctors gained a more accurate understanding of the timing of ovulation, success rates for the technique increased during the twentieth century.[10] Despite this long history, the *Scientific American* described artificial insemination to its popular audience in 1934 as an "essentially new scientific practice" that offered great benefit to the "about 50,000 women [who] leave the marriage altar [annually], later to discover that they are apparently fertile but childless."[11] Just as in 1954, the test tube baby was portrayed to the lay public as a modern innovation on the cutting edge of the application of science to medicine.

In 1934 test tube babies were also in daily newspapers. Twin girls, conceived by artificial insemination using fresh semen, made headlines when their mother, Lillian Lauricella, and her doctor, Frances Seymour, were willing to discuss the artificial conception of the babies.[12] Lauricella's babies were described as resulting from artificial insemination using her husband's semen, but Dr. Seymour also talked to the press about creating "eugenic babies" using donor sperm.[13] *Scientific American* had discussed "babies by scientific selection" of sperm donors as "one of the most significant eugenic developments in the his-

9. Robert L. Dickinson, "Suggestions for a Program for American Gynecology," *Transactions of the American Gynecological Society* 45 (1920), 1, 6–7.

10. Alan F. Guttmacher, "The Role of Artificial Insemination in the Treatment of Sterility," *Journal of the American Medical Association* 120 (10/10/1942), 442, 443; Alan F. Guttmacher, John O. Haman, and John MacLeod, "The Use of Donors for Artificial Insemination: A Survey of Current Practices," *Fertility and Sterility* 1 (1950), 264, 267, 270; Abner I. Weisman, "Studies on Human Artificial Insemination," *Transactions of the Conference on Sterility and Infertility* (1946), 126–27. In 1933 Alan F. Guttmacher's *Life in the Making* (New York, 1933), 200–202, a lay guide to reproduction, presented donor and husband artificial insemination as well-established treatments for infertility.

11. John Harvey Caldwell, "Babies by Scientific Selection," *Scientific American*, March 1934, 124–25.

12. The story was reported on May 1, 1934 in, for example, the *New York Times*, the *Chicago Daily Tribune*, the *Washington Post*, the *Los Angeles Times*, and the *Billings Gazette*, and also in the May 12 issue of *Newsweek*. See also Marsh and Ronner, *The Empty Cradle*, 161–63.

13. *Los Angeles Times,* 5/1/1934. But compare Marsh and Ronner, *Empty Cradle*, 163. For a detailed discussion of eugenics and artificial insemination, see Cynthia R. Daniels and Janet Golden, "Procreative Compounds: Popular Eugenics, Artificial Insemination and the Rise of the American Sperm Banking Industry," *Journal of Social History* 38 (2004), 5, 9.

tory of man,"[14] but the newspaper articles revealed a widespread grave distrust of interfering with nature by assisted conception. After the Lauricella story broke, the New York Academy of Medicine quickly released a statement intended to quell the demand for such services, describing artificial insemination as risky, difficult, and "rarely a solution" to a barren marriage.[15] As Bunge and Sherman would later, Seymour drew criticism from those within the medical profession who found her enthusiastic embrace of donor insemination distasteful.[16]

Many public discussions, both critical and supportive, failed to distinguish between artificial insemination by husband and by donor. Gallup polls taken in the 1940s and 1950s found that more Americans disapproved than approved of the technique, but the poll questions did not specify the source of the semen.[17] Some blanket condemnations, like that of the New York Academy of Medicine, were directed at the technique in general. The Roman Catholic Church, for example, had condemned all means of artificial impregnation as early as 1897, and it reiterated its opposition, based on the separation of sexuality and reproduction, through the 1950s.[18] The medical community knew, however, that the majority of successful artificial inseminations used donor semen. In fact, donor insemination was virtually the only effective technique medicine had to offer infertile men—not exactly a cure but a solution for the involuntarily childless.[19]

It was these "babies by scientific selection" who were the source of lay and medical fascination and condemnation. Despite the promise of donor insemination, some doctors at mid-

14. Caldwell, "Babies by Scientific Selection," 124.

15. *New York Times*, 5/10/1934.

16. Kara W. Swanson, "Adultery by Doctor: Artificial Insemination, 1890–1945," *Chicago-Kent Law Review* 87 (2012), 591, 610n, 626–27; Marsh and Ronner, *The Empty Cradle*, 165–66.

17. *Los Angeles Times*, 5/24/1953 (28% approval, 30% disapproval in a nationwide Gallup poll, similar to results in 1949).

18. Glanville Williams, *The Sanctity of Life and the Criminal Law* (New York, 1966, revised and expanded from the 15th Annual James S. Carpentier Series, Columbia University School of Law, April 1956), 129; Gannon F. Ryan, "The Religious Viewpoints: Catholic," *Syracuse Law Review* 7 (1955–56), 99–101.

19. Guttmacher, Haman, and MacLeod, "The Use of Donors," 266.

century would not perform artificial insemination at all; others would do so using husband sperm, but not donor sperm, focusing their objection on the insertion of a third party into family formation.[20] In addition to moral and religious concerns, doctors and lawyers alike in the 1940s and 1950s worried that donor insemination was simply adultery by doctor, a possibly illegal practice that produced bastards.[21] Yet others, like Seymour and the author of the *Scientific American* article, found donor insemination an exciting technology that offered not only hope for the involuntarily childless but also the possibility of improving the human race through selective breeding. The Nobel Prize–winning geneticist Hermann Muller had publicly advocated planned human breeding since the 1930s.[22] The fittest men could father the next generation, not yet after death, but extramaritally, supporting eugenic goals popular among educated elites. Science could offer babies both to the desperate childless and to those who wanted a superior "eugenic" baby.

The tension between the promise and threat of artificial insemination was captured evocatively in fiction. Aldous Huxley included artificial insemination as part of his futuristic vision in *Brave New World* (1932). He imagined a technologic dystopia in which reproduction occurred entirely in factories and "scientific selection" was used to create different biological castes of humans. Artificial insemination, "artsem" in Newspeak, was also an aspect of the regime described in George Orwell's chilling critique of totalitarianism, *1984*, published in 1949.[23]

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20. Ibid.

21. Samuel A. Levinson, ed., *Symposium on Medicolegal Problems* (Philadelphia, 1948), 43–87. See also Swanson, "Adultery by Doctor," 616–32.

22. Daniels and Golden, "Procreative Compounds," 8, 9–11. Muller, in multiple venues, advocated sperm banking to advance his long-held views on planned human evolution. See, for example, H. J. Muller, *Out of the Night: A Biologist's View of the Future* (New York, 1935), 111; Elof Axel Carlson, *Genes, Radiation, and Society: The Life and Work of H. J. Muller* (Ithaca, NY, 1981), 228, 398; Daniels and Golden, "Procreative Compounds," 13. There is no evidence that Bunge met Muller or read his writings, but Sherman later visited Muller in Indiana at Muller's invitation to discuss sperm banking. Letters between Muller and Sherman, dated 1963, copies in author's possession.

23. Aldous Huxley, *Brave New World* (London, 1932); George Orwell, *1984* (London, 1949). These English novels were republished and widely read in the United States.

As evidenced by Orwell's novel, ambivalence about applying technomedicine to human reproduction persisted at midcentury. Yet the concerns of lawyers, social commentators such as Huxley and Orwell, and the many Americans who disapproved of artificial insemination were counterbalanced by the continued enthusiasm of many doctors for fertility treatments. The post–World War II period, characterized by the baby boom and a heightened emphasis on domesticity and maternity, saw an increase in the number of couples who were determined to take active steps to achieve parenthood.[24] They turned to medicine, and the medical community was increasingly willing and able to focus on their plight.

In 1944 a group of doctors had founded the first professional association focused on treating the infertile, the American Society for the Study of Sterility. One of the goals of the organization was to bring together urologists and gynecologists, whose separate training and sex-segregated patient populations limited their ability to treat and understand the infertile couple.[25] In the nineteenth century fertility treatments had focused nearly exclusively on women, under the assumption that all potent men were fertile. By the mid–twentieth century, however, as the medical profession acknowledged that men could be infertile or subfertile, many hospitals established multi-specialty fertility clinics to treat both partners in an involuntarily childless marriage.[26]

The University of Iowa opened such a clinic in early 1952. The new clinic was staffed by a gynecologist, a urologist, an anatomist to examine biopsies, and an endocrinologist to conduct hormone assays. University of Iowa doctors in the early 1950s, like doctors elsewhere at the time, practiced artificial insemination both by husband and by donor. Especially in the latter case,

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24. Elaine Tyler May, *Barren in the Promised Land: Childless Americans and the Pursuit of Happiness* (New York, 1995), 127–40, 148, 153–57; Marsh and Ronner, *The Empty Cradle*, 183–89.

25. Walter E. Duka and Alan H. DeChenery, *From the Beginning: A History of the American Fertility Society* (Birmingham, AL, 1994), 1, 16–17. The American Society for the Study of Sterility is now the American Society for Reproductive Medicine. Ibid., 99–100; www.asrm.org/about/ (last viewed 6/2/2012).

26. May, *Barren in the Promised Land*, 43-44; Margaret Marsh and Wanda Ronner, *The Fertility Doctor: John Rock and the Reproductive Revolution* (Baltimore, 2008), 162–63.

doctors and patients kept the treatment secret to avoid public condemnation and controversy.[27] Doctors anywhere who performed donor insemination struggled quietly to recruit donors and to have fresh sperm available as needed, an aspect of their practice that they considered "a heavy burden."[28] With clinicians experienced in artificial insemination by husband and by donor, a stream of patients seeking treatment, and the burden of managing sperm donors, the Iowa clinic had the combination of expertise and demand to make good use of a supply of frozen sperm, ready whenever needed.

IN 1952 a combination of such expertise and demand was not unique to the University of Iowa, yet no frozen sperm supplies existed, in Iowa City or elsewhere. Iowa City became the birthplace of the first babies conceived using frozen sperm in part because of a serendipitous interaction between two men who came from different disciplines and were of greatly differing status within the medical school.

Dr. Raymond Bunge, an associate professor, was the urologist working with the fertility clinic. Born and raised in Michigan, Bunge had come to Iowa City for a residency in 1938 after graduating from the University of Michigan medical school. He trained under the chief of urology, Dr. Nathaniel G. Alcock, a forceful personality whom Bunge continued to address affectionately as "Chief" even after Alcock's retirement to California in 1949. Aside from his military service during World War II, Bunge remained on the Iowa medical school faculty until his retirement in 1976.[29]

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27. William C. Keettel, Raymond G. Bunge, James T. Bradbury, and Warren O. Nelson, "Report of Pregnancies in Infertile Couples," *Journal of the American Medical Association* 160 (1/14/1956), 102, 104; Clintie Winfrey Kenney, "Artificial Insemination," *American Mercury* 66 (1948), 400–401. For discussion of the emphasis on secrecy, see Swanson, "Adultery by Doctor," 611–13.

28. Sophia J. Kleegman, "Therapeutic Donor Insemination," *Fertility and Sterility* 5 (1954), 7, 17.

29. "Bunge, Raymond" folder, Faculty and Staff Vertical Files Collection (RG 01.15.03), University of Iowa Archives, University of Iowa Libraries, Iowa City (hereafter cited as Bunge Faculty File); Bunge to Dr. N. Alcock, 2/14/1953, Correspondence "A," 1950–1963, box 1, Papers of Raymond Bunge (RG 99.0002), University of Iowa Archives, University of Iowa Libraries, Iowa City (hereafter

After returning from the war, Bunge had explored leaving Iowa, putting out feelers to colleagues in California and North Carolina. He may have been motivated by the state of the university hospital, which, after the Great Depression and wartime shortages of staff and money, was, in the words of one hospital administrator, "in a gloomy state of disrepair and ineffectiveness" in the early postwar years.[30] By 1952, though, Bunge had not "escaped from the department," as he described his efforts to a West Coast colleague.[31] Meanwhile, the hospital and medical school had undergone a "dramatic transformation," infused with new funds and launched on a trajectory to become a nationally recognized institution.[32]

Now 44 years old and a married father of four children, Bunge was anxious to secure a promotion to full professor at Iowa, a position he would earn in 1953.[33] His publication record would be an important part of his promotion case and perhaps could open up opportunities elsewhere. Before his involvement with frozen sperm, Bunge had published case reports about treating kidneys and prostates and was embarked on a long-term research project investigating cancer of the urinary system. As part of this latter project, he was applying tissue culture techniques to tumor cells, a way of keeping cells alive *in vivo*. By Bunge's own account, however, until he met Jerome ("Jerry") K. Sherman, he had not been thinking about freezing sperm.[34]

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cited as Bunge Papers); Persons, *The University of Iowa,* 227–34; Samuel Levey, Derek Maurer, Lee Anderson, and Matthew Schaefer, *The Rise of a University Teaching Hospital: A Leadership Perspective, The University of Iowa Hospitals and Clinics* (Chicago, 1996), 188–95.

30. Levey et al., *Rise of a University Teaching Hospital*, 209 (quote), 267; Bob Prentiss to Bunge, 5/24/1948, Correspondence "P," 1948–1962, box 2, Bunge Papers; Bunge to Dr. William N. Harness, 1/2/1952, Correspondence "H," 1948–1964, box 1, Bunge Papers.

31. Bunge to Harness, 1/2/1952.

32. Levey et al., *Rise of a University Teaching Hospital*, xxiv–xxv, 225, 228, 258–59. The medical school faculty had also won a long-running battle with the hospital administration for control of the hospital. Ibid., 224–25.

33. A fifth child had died earlier. Obituary, *Iowa Press Citizen*, 2/23/1998; Bunge Faculty File.

34. R. G. Bunge and A. P. Barer, "Hemolysis during Transurethral Prostatic Resection," *Journal of Urology* 60 (July 1948), 122; R. G. Bunge and R. J. Stein, "Cyto-dynamic Properties of Urinary Neoplasms. I. Cultivation In Vitro of

Bunge's collaborator was also a World War II veteran, but a younger man who was just beginning his career in research medicine. Sherman was a native of Brooklyn, New York, who began college at age 16, only to drop out to join the navy. He finished his B.S. in biology at Brown University in 1947, and earned a master's degree at Western Reserve University in Ohio (now Case Western Reserve University). He then came to Iowa in 1949 to pursue a doctorate in zoology, drawn in part by the offer of a research assistantship in zoology.[35]

Sherman, with expertise in electron microscopy and tissue sectioning, was soon recruited by the urology department chair, Dr. Rubin Flocks. The urology department had an expensive freeze-drying apparatus, and Flocks hired Sherman as a research assistant to freeze-dry renal tissues and perform biochemical analysis.[36] That job led Sherman to delve into the literature of freezing and freeze-drying tissues, and he became intrigued when he learned that as early as 1866 researchers had reported that human sperm could survive low temperatures. That result was even more interesting when considered alongside a newly published report by British scientists that glycerol preserved the vitality of some animal sperm during freezing and thawing.[37]

Transitional Cell Carcinoma of the Ureter," *Journal of Urology* 64 (Nov. 1950), 646–50; R. G. Bunge and W. N. Harness, "Unilateral Polycystic Kidney in an Infant," *Journal of Urology* 65 (June 1951), 972–75; R. G. Bunge and W. N. Harness, "Blastomycosis of the Prostate: Case Report," *Journal of Urology* 66 (Aug. 1951), 263–64; R. G. Bunge and R. J. Stein, "Cyto-dynamic Properties of Urinary Neoplasms. II. Maintenance of 'Hypernephroma' In Vitro," *Journal of Urology* 66 (July 1951), 103–5; R. G. Bunge, "Cyto-dynamic Properties of Urinary Neoplasms. III. Cultivation In Vitro of Carcinoma of the Kidney," *Journal of Urology* 69 (Jan. 1953), 18–20; *Daily Iowan*, 7/9/1975.

35. Jerome K. Sherman curriculum vitae, dated 2/22/1996 and updated 2005 (copy in author's possession) (hereafter cited as Sherman CV); Steve Maravetz, "Baby-Making Breakthrough," *Iowa Alumni Quarterly* 51 (Winter 1998), 29; personal communication from Jerome K. Sherman, 8/19/2011 (hereafter cited as Sherman interview).

36. Sherman interview; Handwritten notes of Jerome K. Sherman, August 2011 (in author's possession); Maravetz, "Baby-Making Breakthrough," 29.

37. P. Mantegazza, "Sullo Sperma Umano," *Rend. Real Insti. Lamb.* 3 (1866), 183, as cited in Charles Benedict Davenport, *Experimental Morphology* (New York, 1908), 244, 270; C. Polge, A. U. Smith, and A. S. Parkes, "Revival of Spermatozoa after Vitrification and Dehydration at Low Temperatures," *Nature* 164 (10/15/1949), 666.

The British scientists were working with various domesticated animals. Breeding by artificial insemination had advanced rapidly in the 1930s and 1940s. The practice first became widely used with dairy cattle in the United States in the 1930s and spread rapidly after World War II.[38] In 1945 one early American advocate declared, "No other new practice in the field of animal husbandry has been welcomed with so much approval throughout most of the world as artificial insemination."[39] By 1952, up to 75 percent of American farmers in agricultural areas such as Iowa were using artificial insemination to breed their cattle. In the 20 years after the war, the average milk yield per dairy cow in the United States jumped 65 percent, an improvement attributed to the use of artificial insemination to breed better cows.[40] Iowa City, in the middle of farm country, was surrounded by those knowledgeable about bovine insemination. Drawing on the expertise of the animal husbandry faculty at Iowa State College in Ames, farmers were using artificial insemination to improve their dairy herds.[41]

The use of artificial insemination in cattle, however, was limited by the extracorporeal lifespan of sperm. Despite the development of careful techniques to ship sperm in thermoses packed in ice, the distance from prize bull to herds of cows was a problem.[42] There was also the tantalizing prospect of using semen from a bull to inseminate cows not just during the bull's lifetime, but afterwards. The limits of space and time could be transcended if the sperm could be frozen. The British researchers had reported "dramatic results" with the use of glycerol,

38. Enos J. Perry, ed., *The Artificial Insemination of Farm Animals*, 4th rev. ed. (New Brunswick, NJ, 1968), 7. Perry edited the first edition of his book in 1945 (New Brunswick). Perry provides a brief historical survey of artificial insemination in farm animals. Ibid., 3-12. The early years of artificial insemination of dairy cattle in the United States are also discussed in J. W. Bartlett, "Artificial Insemination of Dairy Cattle," in *The Problem of Fertility: Proceedings of the Conference of Fertility, Held under the Auspices of the National Committee on Maternal Health*, ed. Earl T. Engle (Princeton, NJ, 1946), 206–27.

39. Perry, ed., *Artificial Insemination,* vii.

40. Mark Friedberger, *Farm Families and Change in Twentieth-Century America* (Lexington, KY, 1988), 20; Perry, *Artificial Insemination*, viii.

41. Bunge to Professor R. M. Melampy, 1/22/1953, Correspondence "M," 1953–1965, box 2, Bunge Papers.

42. Perry, *Artificial Insemination*, 239–44.

leading to the recovery of full motility of fowl spermatozoa after freezing and thawing, as well as "much increased" revivability of frozen human sperm. Using previously frozen sperm, the British were able to fertilize chicken eggs and successfully inseminate cattle, naming the first resulting calf "Frosty."[43] One of the British researchers told his scientific colleagues that through this work "time has lost its significance" and that "what is true of animals is also true of men." In 1951 the *New York Times* had reported that this research made "death no bar to being a father."[44]

Sherman, the young graduate student in Iowa, without any experience in artificial insemination or with sperm, undertook to test this provocative statement. Could frozen and thawed sperm fertilize a human egg? Frosty was cavorting in England, but experiments had shown time and time again that sperm varied from mammal to mammal. The British researchers had reported that the same glycerol dilutions that worked so well on fowl sperm failed on rabbit sperm.[45] What would be needed to produce a human equivalent of Frosty?

The possibility of using frozen sperm to create a human baby had remained unrealized in part because successfully reviving frozen sperm was only useful if artificial insemination of humans was a reliable technique. Despite reports of artificial insemination of humans in the late eighteenth century, throughout the nineteenth century it had remained a technique with more theoretical than actual promise. In 1866 American gynecologist J. Marion Sims reported that he was giving up after 55 attempts to artificially inseminate women with husband sperm had led to only one pregnancy.[46] When the Iowa clinic opened in 1952, however, doctors could anticipate reasonable success using fresh sperm.[47]

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43. Polge et al., "Revival of Spermatozoa," 666; C. Polge, "The Work of the Animal Research Station, Cambridge," *Studies in History and Philosophy of Biological and Biomedical Sciences* 38 (2007), 511–20, 513–14.

44. *New York Times*, 8/15/1951.

45. Polge et al., "Revival of Spermatozoa," 666.

46. J. Marion Sims, *Clinical Notes on Uterine Surgery: With Special Reference to the Management of the Sterile Condition* (New York, 1866), 369.

47. See sources in note 10, above.

Enthused by the possibilities and the challenge, Sherman began to experiment with his own sperm after hours, testing freezing protocols in search of a technique that would maximize the percentage of viable sperm after thawing. His original research plans cast aside, this work became his doctoral project, supervised by Professor Harold Beams of the zoology department. Sherman's job in the urology department not only gave him a new research direction, but also brought him into contact with Bunge. The two men had met casually, and, according to Sherman, had gotten along well. Bunge hired Sherman, an impecunious student, to paint his house. When Sherman shared his excitement about his after-hours experiments with Bunge, the senior faculty member was intrigued.[48]

Sherman felt that he was succeeding in obtaining sufficient percentages of viable sperm after freeze-thawing to make conception by insemination possible. If he were right, such a pregnancy would be a clinical first, a surefire route to professional recognition for the doctor who accomplished it. As a student and a nonphysician, however, Sherman lacked both access to patients and the status to convince the power structure within the medical school to permit such a bold experiment. Bunge could surmount these obstacles. In the fall of 1952 he went to the department chair, Flocks, and urged him to convert Sherman's research assistantship freeze-drying kidney sections into a higher-paying research associate position, in which his responsibility would be to freeze and thaw sperm for use with patients.[49]

Within a few months, Sherman's experiments made the leap from laboratory to clinic, transforming speculation about using frozen human sperm in artificial insemination into reality. Bunge, on staff at the fertility clinic, had access to couples seeking fertility treatment and to colleagues with expertise in artificial insemination. He recruited the obstetrician-gynecologist from the clinic, Dr. William Keettel, to perform the inseminations. According to Sherman, Bunge's contribution was limited to this liaison role—

48. Sherman interview; Jerome K. Sherman, "Freezing and Freeze-Drying of Human Spermatozoa" (Ph.D. diss., University of Iowa, 1954).

49. Sherman interview; Sherman CV.

Sherman had performed the freezing experiments and, in his new job, processed the sperm, and Keettel treated the patients.[50] As the staff urologist, however, Bunge may have been the doctor who examined childless husbands, and Bunge viewed himself as a full participant in the experiment. In early January 1953 he described the project as his own in correspondence with the head of the animal husbandry department at Iowa State, to whom he wrote seeking information about how bull spermatozoa were preserved.[51] When the world learned about the project, Bunge would receive full credit—and full condemnation.

FLOCKS, Keettel, Bunge, and Sherman must have been aware of the controversial status of artificial insemination by husband or by donor. Just a few years earlier, in neighboring Minnesota, a proposal to recognize donor insemination as a legal way of creating a legitimate child caused a public outcry, and the draft legislation was scuttled.[52] In 1949 a University of Iowa law student had advocated similar legislation to legitimate test tube babies in Iowa, noting that "many physicians, sociologists, psychologists and laymen" believed that couples desiring children should have access to this treatment. The author, however, also noted that social and theological objections were "still in evidence" to this means of procreation as not "normal."[53] That same year, Pope Pius XII told a meeting of Catholic physicians that artificial insemination of any kind was "entirely illicit and immoral."[54] According to a nationwide poll, only 28 percent of respondents approved of artificial insemination in 1953.[55] It was clear in the early 1950s that to announce a new type of "test tube

50. Sherman interview; R. G. Bunge, W. C. Keettel, and J. K. Sherman, "Clinical Use of Frozen Semen," *Fertility and Sterility* 5 (1954), 520–29.

51. Bunge to Phineas S. Sheaer, 1/9/1953, Correspondence "S," 1952–1963, box 2, Bunge Papers.

52. Thurston A. Shell, "Artificial Insemination—Legal and Related Problems," *University of Florida Law Review* 8 (1955), 304, 315.

53. "Legal and Social Implications of Artificial Insemination," *Iowa Law Review* 34 (1949), 658, 665–66.

54. Williams, *Sanctity of Life*, 129. The Anglican Church also condemned donor insemination and recommended that its practice be criminalized. Ibid., 131.

55. *Los Angeles Times,* 5/24/1953.

baby," conceived with frozen sperm, would be both a scientific breakthrough and highly controversial, and there was no indication that Iowans were any more receptive to the practice than Americans elsewhere.

Doctors who treated the infertile, however, were generally much more sympathetic to the use of artificial insemination than the public at large, and among the minority of Americans who found themselves involuntarily childless, demand for insemination was steadily increasing.[56] The University of Iowa clinic was already practicing artificial insemination without any public outcry. With Flocks's approval and Keettel's help, Sherman and Bunge went ahead with the experiment, seeking to be the first to use frozen sperm in assisted conception.

Sherman recalls that he was excited about the high rates of post-freezing motility he was able to achieve and anxious to test viability in humans. His hope was to bring happiness to couples who wanted children.[57] Bunge was already working with the infertile at the university clinic and was almost certainly motivated by the thought of taking part in this historic first. He also was intrigued by the eugenic implications of human sperm banks. Just as Iowa farmers had improved their dairy herds, humans could potentially improve the next generation through selection of sperm donors. Even before the first pregnancies had been announced, Bunge mused about the implications of the work in a letter to his mentor, Alcock. "Now this [research] has tremendous implications, both philosophical and clinical. . . . The spermatozoa of great men can be preserved for long periods of time and perhaps a race of superior individuals can be ultimately expected."[58]

Along with his enthusiasm about donor insemination and "fatherhood after death," however, Bunge showed caution. As a faculty member whose promotion was still winding its way through the university administration, Bunge was aware of po-

56. "Discussion and Question Period," in *Symposium on Medicolegal Problems,* ed. Samuel A. Levinson (Philadelphia, 1948), 86–87; May, *Barren in the Promised Land,* 147–48.

57. Sherman interview; Maravetz, "Baby-Making Breakthrough," 30.

58. Bunge to Dr. N. Alcock, 2/24/1953, Correspondence "A," 1950–1963, box 1, Bunge Papers.

tential pitfalls. Anxious for professional recognition, he tried to manage public and academic opinion so that he and Sherman would receive accolades for their scientific advance, rather than brickbats for their social transgression.

DRAWING ON the British animal work, Sherman had performed experiments to test optimal methods of freezing and thawing sperm, considering the speed of temperature transitions, the volume of semen used, and the use of additives.[59] According to Sherman's recollections, he drafted a series of scientific papers, detailing the results he had produced during his hours of solitary laboratory work. Bunge then included himself as a coauthor, which was a "disappointing" surprise to the young graduate student. Sherman felt that Bunge was unfairly seeking credit for Sherman's efforts. Regardless of Bunge's contributions to the research, the practice of including a sponsoring senior faculty member as an author on papers presenting work done by a junior scholar was not outside the range of academic norms, and Sherman's graduate advisor counseled him to accept the situation.[60] These publications, the first of Sherman's scientific career, would also form part of Bunge's research record.

The first two papers were accepted by the *Proceedings of the Society for Experimental Biology and Medicine*. Founded in 1903, the society and its journal were designed to foster the new scientific medicine of the twentieth century, disseminating medically relevant work done in the laboratory, as distinct from clinical reports in medical journals. *Proceedings* reached a different and broader audience than the *Journal of Urology*, the official publication of the American Urological Association, where Bunge had previously published his research.

The first report, submitted in March 1953, detailed the results from four approaches to freezing semen. It showed that slow freezing of glycerol-treated sperm on dry ice was the most successful in maintaining post-thaw motility. Even before publishing the laboratory results, Bunge and Sherman decided to

59. J. Sherman and R. Bunge, "Observations on Preservation of Human Spermatozoa at Low Temperatures," *Proceedings of the Society for Experimental Biology and Medicine* 82 (1953), 686, 688.

60. Sherman interview.

take Sherman's procedures to the clinic. The paper announced that "clinical application of practical storage banks for human spermatozoa in infertility problems is now in progress."[61] The first sperm bank was being created. Further, given the survival rate of the frozen sperm of 60–78 percent, and the unchanged "type, speed and duration of motility" before and after preservation, "artificial inseminations to test the ability of frozen human spermatozoa to fertilize and induce normal embryonic development are underway."[62] Would any patient achieve pregnancy?

In late February 1953 Bunge wrote to his former "Chief" that "the big problem here is whether the spermatozoa are capable of producing normal development, and we have several cases inseminated now and are anxiously waiting to see if any pregnancies will result."[63] Bunge knew as a urologist that motility was apparently necessary for sperm viability but not sufficient. Dr. Abner Weisman, a gynecologist and fertility specialist, had published the first manual on sperm in 1941, but by the 1950s identifying normal sperm was still an inexact art.[64] It was possible that despite the motility of a frozen-thawed sperm sample, it would fail to inseminate an egg.

The Iowa researchers were still waiting "on pins and needles" in April to find out the result of a pregnancy test for one patient.[65] At least two women had undergone one unsuccessful round of insemination using frozen-thawed sperm before they conceived the following month. By July, though, there were three confirmed pregnancies. This was the awaited result, the breakthrough.[66]

Bunge sent a brief paper to the journal *Science*, announcing that he and Sherman had proven that frozen human sperm could fertilize an egg. Publishing the findings in *Science,* the weekly journal of the largest and most general scientific organization in the United States, the American Association for the Advance-

61. Sherman and Bunge, "Observations on Preservation," 688.

62. Ibid.

63. Bunge to Dr. N. Alcock, 2/24/1953, Correspondence "A," 1950–1963, box 1, Bunge Papers.

64. Weisman, *Spermatozoa and Sterility*; Schellen, *Artificial Insemination,* 60–66.

65. Bunge to Paul Engle, 4/11/1953, Correspondence "E," 1950–1964, box 1, Bunge Papers.

66. Bunge et al., "Clinical Use," 526, 528.

ment of Science, would enable the authors to reach an even bigger audience. Time ticked by while Bunge awaited a reply from the editor. The pregnancies were advancing, and he wanted the announcement published before the babies arrived. Bunge sent a follow-up letter, asking about the fate of the manuscript. About two weeks later, the answer came: *Science* would not publish the paper. The editors found it "premature" until "the products of conception have been observed."[67]

The rejection was dated August 11; by August 19 the paper was in the mail to the editors of *Nature*.[68] *Nature* is the British equivalent of *Science*, a general science journal, the most prestigious and widely read in Britain and, like *Science*, read by scientists around the world. If Bunge and Sherman could not reach an international audience from the United States, they would do so from England. *Nature* accepted the brief article, and it appeared in the October 23 issue. The authors used scholarly understatement to announce their triumph. "The ability of glycerol-treated, frozen and thawed human spermatozoon to fertilize and actuate the human ovum has been observed." They revealed that three women had been inseminated with frozen sperm, had now missed from three to six menstrual periods, and were conclusively determined to be pregnant.[69] The news of these new test tube babies was out.

Anticipating both intense public interest and criticism, the researchers had worked to keep the pregnancies secret before their feat was published in a peer-reviewed journal. Once having achieved such a publication, however, they sought widespread acknowledgment by issuing a press release to American news outlets to coincide with the article's appearance.[70] The

67. Bunge to Editor of *Science*, 7/23/1953, and Editor of *Science* to Bunge, 8/11/1953, Correspondence "S," 1952–1963, box 2, Bunge Papers. The authors also received a rejection from the *Proceedings of the Society for Experimental Biology and Medicine*. Bunge to Paul Henshaw, 9/30/1953, Correspondence "H," 1948–1964, Bunge Papers.

68. Bunge to Editor of *Nature,* 8/19/1953, Correspondence "N," 1953–1963, box 2, Bunge Papers.

69. R. G. Bunge and J. K. Sherman, "Fertilizing Capacity of Frozen Human Spermatozoa," *Nature* 172 (10/23/1953), 767–68.

70. Science Service press release, "Women Pregnant by Frozen Human Sperm," 10/26/1953, Correspondence "S," 1952–1963, box 2, Bunge Papers.

strategy worked. The press release and the *Nature* article brought notice at the national level, including a brief mention in the *New York Times*.[71] The information released in *Nature*, that one pregnancy was six months advanced by August, seemed to indicate that a baby would be born very soon.

Inquiries and reaction streamed in from various quarters. Within days, the publisher of *Tops*, a pocket-sized magazine for adults, wrote to ask for a copy of the *Nature* article in order to describe the research to his readers. A journalist for a "national magazine" in Mexico wanted more information. Infertile couples wrote, wanting access to the new technique. Doctors across the United States, from California to New York, wrote with questions. Had the babies been safely delivered? What tips could Bunge give to those wanting to try his techniques?[72] Even the editor of *Science* wrote, expressing his "chagrin" that the researchers had chosen to publish with his transatlantic rival, and asking if they would consider publishing their update in *Science*.[73]

Bunge considered how best to provide the medical community with more details. A prominent fertility specialist on the West Coast, Dr. Edward Tyler, invited Bunge to address the local branch of the American Society for the Study of Sterility and to send a more complete clinical article to *Fertility and Sterility*.[74] *Fertility and Sterility* was the new journal of reproductive medicine the society had founded in 1950. Bunge accepted both invitations, and by November Bunge and Sherman had written their first paper for the clinical community, including Keettel as

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71. *New York Times*, 10/24/1953.

72 . William Bolton to Bunge, 10/27/1953, Correspondence "B," 1949–1964, box 1, Bunge Papers; Immanuel Kleinfeld to Bunge, 2/8/1954, Correspondence "K," 1952–1962, box 2, Bunge Papers; Herbert L. Shapiro to Bunge, undated (Bunge's reply dated 11/2/1953), Correspondence "S," 1952–1963, box 2, Bunge Papers; William Harness (CA) to Bunge, 10/1/1953, Correspondence "H," 1948–1964, box 1, Bunge Papers; Sophia Kleegman (NY) to Bunge, 12/18/1953, Correspondence "K," 1952–1962, box 2, Bunge Papers.

73. Bentley Glass to Bunge, 11/30/1953, Correspondence "S," 1952–1963, box 2, Bunge Papers. Bunge must have taken some pleasure in his reply to the editor of *Nature*, suggesting that Mr. Glass check his correspondence files in order to understand the source of his chagrin. Bunge to Glass, 12/2/1953, Correspondence "S," 1952–1963, box 2, Bunge Papers.

74. Bunge to Edward Tyler, 10/13/1953, 10/20/1953, and 11/27/1953, Correspondence "T," 1953–1965, box 2, Bunge Papers.

a coauthor. This article greatly expanded on the brief announcement in *Nature*, describing the artificial insemination treatments and the pregnancies in detail.[75] Conspicuously absent from this clinical paper, as from all previous papers and from the press announcement, was any indication whether the frozen sperm used to inseminate the women was donor sperm or husband sperm.[76] If possible, the researchers wanted to avoid the controversy surrounding donor insemination.

There was reason for such caution. The enthusiasm for the Iowa breakthrough was mingled with criticism. One of the British researchers who had developed the glycerol preservation of frozen animal semen and who had earlier claimed that their work was applicable to humans was quoted in an English newspaper caustically describing the Iowa work as "one more example of the scientist happily engaged in a fascinating line of research without worrying very much as to the ultimate desirability of his results."[77] Bunge wrote to personal friends in December that "it's pretty hot where I'm sitting right now" and remarked to another correspondent that "criticism . . . has been heaped upon my head in . . . recent months." Two decades later, Bunge recalled, "I received many letters, some of them signed, asserting that I was a scientific monster, un-Christian, and a disgrace to medicine." Sherman remembered that an Iowa state legislator wrote to the president of the university criticizing the work for treating humans like animals. Frozen sperm and artificial insemination should, many Iowans thought, be the province of

75. Bunge et al., "Clinical Use." The article was not published until 1954.

76. The surviving documents cannot resolve this question. Bunge evidently deliberately did not mention the source of semen in the frozen sperm papers, but he did say the following year that attempts to concentrate a childless husband's sperm by pooling several frozen samples were "rather disappointing." Bunge to E. Perry McCullagh, 3/4/1955, Correspondence "M," 1953–1965, box 2, Bunge Papers. Several years later, Bunge did tell a reporter that husband insemination had been successful "in a few isolated instances." Memorandum to Frank Nye, *Cedar Rapids Gazette*, 10/19/1961, Correspondence "N," 1953–1963, box 2, Bunge Papers. A 1956 review of all infertile couples treated at the Iowa clinic from 1952 to 1955 describes using frozen semen for donor insemination but only the use of fresh semen for husband insemination. Keettel et al., "Report of Pregnancies," 104. Sherman, however, recalls that all the sperm used in the first cases was husband sperm. Sherman interview.

77. Bunge et al., "Clinical Use," 525 (quoting *Manchester Guardian*, 10/29/1953).

the agricultural faculty at Iowa State College, not of the doctors at the University of Iowa medical school.[78]

These new test tube babies provided an opportunity for Bunge and Sherman, neither previously prominent in fertility medicine, to create international reputations, but the criticisms were a constant reminder of the risks of this route to fame. Bunge, as the more senior and as a state medical school professor, had more to lose. As a doctor, he faced an ongoing need to attract patients and was judged against formal and informal codes of medical professionalism by his colleagues. Although his appointment to full professor had been finalized by late 1953, he also needed to be conscious of university and state politics that might affect his future career. Having a state legislator single him out for criticism to the university president was not the kind of attention he needed. To minimize popular and professional criticism, Bunge evidently strove to publish the results in the most prestigious scientific and medical outlets possible. The publications in the peer-reviewed *Proceedings* and *Nature* demonstrated the firm scientific foundation of the work.

The publications also helped to establish Sherman's position as an up-and-coming scientist. While it was disappointing to the young biologist to have an unanticipated coauthor, a publication in the high-profile *Nature* was a coup for any scientist, particularly a graduate student. As he looked for a job in the spring and summer of 1954, after filing his dissertation in February, Sherman could use those publications to support his applications. Bunge arranged for Sherman to receive continuing financial support during his job search, negotiating a one-year research position in urology beginning in July 1954. By October 1954, however, Sherman had said a strained goodbye to Bunge and left for a position working with animal sperm in Madison, Wisconsin.[79]

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78. Bunge to Alan and Louise Duval, 12/10/1953, Correspondence "D," 1952–1964, box 1, Bunge Papers; Bunge to Charles Ernshaw, 12/21/1953, Correspondence "E," 1950–1964, box 1, Bunge Papers; *Daily Iowan*, 7/9/1975; Maravetz, "Baby-Making Breakthrough," 30. Unfortunately, none of the letters Bunge recalled receiving in opposition to the work are preserved in the Bunge Papers.

79. Bunge to Rubin [Flocks], 5/25/1954, Correspondence "S," 1952–1963, box 2, Bunge Papers; Bunge to Warren Nelson, 10/15/1954, Correspondence "N," 1953–1963, box 2, Bunge Papers; Sherman CV.

WHILE SHERMAN was finalizing his thesis and contemplating his next career move, Bunge focused intensely on the clinical outcome. The final piece of the Iowa triumph would be the delivery of the three babies. The health of the babies was a matter of intense concern to the researchers. Proof that frozen and thawed sperm could fertilize an egg was not proof that a normal baby would result. The knowledge of many successful uses of frozen-thawed sperm in animals indicated that the researchers could anticipate success, but the fact remained that the doctors could not be sure what would happen. Bunge wrote to a medical colleague in early December 1953 that "we are nervously awaiting to see what [our patients'] issue will look like."[80]

Before the clinical use of frozen-thawed sperm, Sherman had conducted multiple laboratory tests to determine whether the sperm were normal after thawing. He had performed painstaking microscopic work, using staining techniques to distinguish live and dead sperm, counting mobile sperm in samples, observing and noting the type of motion exhibited, and timing the length that thawed sperm remained active at room temperature. While the pregnancies progressed, Sherman sought additional proof of the normality of frozen-thawed sperm. He looked for changes in the nuclear proteins after glycerol treatment and after freezing and thawing.[81] The now classic paper by James Watson and Francis Crick describing the double helical structure of DNA had just been published in April 1953, and the genetic code was yet to be worked out.[82] Until 1952 the most popular hypothesis had been that proteins carried the theoretical concepts known as "genes," so nuclear proteins were an appropriate place to look for potentially significant

80. Bunge to John A. Hutch, 12/3/1953, Correspondence "H," 1948–1964 (second folder), box 2, Bunge Papers.

81. Sherman and Bunge, "Observations on Preservation," 689; J. K. Sherman and R. G. Bunge, "Effect of Glycerol and Freezing on Some Staining Reactions of Human Spermatozoa," *Proceedings of the Society for Experimental Biology and Medicine* 84 (1953), 179–80.

82. J. D. Watson and F. H. C. Crick, "A Structure for Deoxyribose Nucleic Acid," *Nature* 171 (4/25/1953), 737–38. See also J. D. Watson and F. H. C. Crick, "Genetical Implications of the Structure of Deoxyribonucleic Acid," *Nature* 171 (5/30/1953), 964–67.

changes.[83] It must have been with relief that Sherman detected no changes in nuclear proteins.[84] During the three pregnancies that had been announced in *Nature*, and a fourth that was in progress in 1954, the clinicians also attempted to ascertain the normality of each fetus. In the pre-ultrasound era, they used x-rays to examine the fetal skeleton in the third trimester, a common procedure for any pregnancy in the 1950s. The visualization of an apparently normal fetus must have reassured both patients and doctors.[85]

This same uncertainty dogged later researchers in assisted conception. In 1978, when Lesley Brown was pregnant with the first baby conceived by *in vitro* fertilization (IVF), a technique that moved insemination itself into the test tube, her doctors began to worry when she did not gain enough weight in her last trimester, and then developed toxemia. They placed her on bed rest and eventually delivered the baby by caesarian section, attempting to minimize the chances of a poor outcome. Her daughter, Louise Brown, who arrived safely in an English hospital without apparent abnormality, was widely hailed as the "first test tube baby."[86] Even some years later, when the pioneering American doctors Howard and Georgeanna Jones awaited the birth of the first IVF baby in the United States in 1981, Howard Jones was so fearful of a negative outcome that he entered the delivery room with a draft press release in his pocket, describing his grief and disappointment. The draft remained unused when Elizabeth Carr, like Louise Brown, turned out to be fine.[87]

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83. The state of scientific understanding in the early 1950s is described in Gunther S. Stent, "The DNA Double Helix and the Rise of Molecular Biology," in James D. Watson, *The Double Helix: A Personal Account of the Discovery of the Structure of DNA Together with Commentary, Reviews, and Original Papers,* ed. Gunther S. Stent (New York, 1980), xi–xxii.

84. Sherman and Bunge, "Effect of Glycerol and Freezing," 179.

85. Randi Hutter Epstein, *Get Me Out: A History of Childbirth from the Garden of Eden to the Sperm Bank* (New York, 2010), 190–91; Bunge et al., "Clinical Use," 520–29.

86. Robin Marantz Henig, *Pandora's Baby: How the First Test Tube Babies Sparked the Reproductive Revolution* (Boston, 2009), 142, 150–52, 172; "The First Test-Tube Baby," *Time Magazine*, 7/31/1978, 58–69.

87. Henig, *Pandora's Baby*, 224–25.

No such press releases were needed in Iowa City in 1953 for these earlier "test tube babies." The researchers had promised complete anonymity to the couples who had agreed to participate in their experiment. Unlike the situation 25 years later, there was to be no press conference outside the delivery room for the first frozen sperm baby. Bunge's plan was to wait until all the babies had been born, keep the births secret, and then announce the final data at one or more major professional meetings. After the pregnancies were disclosed, the researchers sought to discourage inquiries by telling the press in early December that the first baby would be born "within the next three months"; they would not reveal any further information until that time.[88] The plan was for the news of the babies' arrival, like the news of the pregnancies, to be revealed first in a forum and in language aimed at medical researchers, and only then to be picked up by the lay media.

Bunge was planning to attend the American Urological Association meeting in New York City in April 1954 to present his work to his colleagues.[89] He was also very interested in an annual prize for the best work in reproductive medicine offered by the American Society for the Study of Sterility. The Iowa breakthrough, proving that frozen-sperm banks could be used as a way of facilitating human reproduction, was surely the type of research suitable for such an honor. Bunge watched for an announcement of the competition and told friends in California that if he were awarded the prize, he would be traveling with his wife to San Francisco in the spring to attend the society's meeting. The deadline for prize submissions was March 1. While planning his talk for the New York conference (Bunge made reservations at the Waldorf-Astoria as he anticipated his triumphant visit) and writing his paper for the prize committee, Bunge refused to give out any details about the babies, telling those who inquired that the university information service had asked him to release information only through them.[90]

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88. *Cedar Rapids Gazette,* 12/3/1953.

89. Bunge to William Harness, 10/5/1953, Correspondence "H," 1948–1964, box 1, Bunge Papers.

90. Bunge to William Harness, 1/19/1954, Bunge to John O. Haman, 2/5/1954, Bunge to John Hutch, 4/23/1954, and William Harness to Bunge, 2/12/1954,

In private, Bunge could not help sharing his good news with friends and family as the babies arrived. He kept his mother, still living in Michigan, up to date. "It won't be long," he told her jokingly, "before my icicles will be in the deep freeze section of the A&P stores." Yet he cautioned her that the information was a "classified secret." Without admitting to the births directly, Bunge was also privately telling medical friends who were eager to start using frozen sperm in their practices but worried about the risk of abnormalities that he saw no reason not to proceed.[91]

Bunge's strategy required keeping the births quiet for several months while he made his professional arrangements. He was also collecting information on one of the babies remotely, because one of the pregnant women had moved away from Iowa City with her husband. The couple was keeping Bunge informed by mail about her pregnancy as her December due date approached. By a letter dated December 21, 1953, the news came from California: a girl, born December 19, mother and baby doing well.[92] The news of the safe birth confirmed the researchers' highest hopes. Now the prize paper could be written, and the talks prepared.

In February 1954, though, as the researchers were writing up their clinical notes for the prize committee, matters started slipping out of control. Bunge wrote to the father of the baby girl, asking for an update on her weight gain. The reply was devastating. The parents had learned that one of their daughter's eyes was incompletely formed and that she would be blind in that eye.[93] Was this malformation a result of the freezing and thawing of the sperm? What should the clinical report say?

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all in Correspondence "H," 1948–1964, box 1, Bunge Papers; Bunge to Waldorf-Astoria Hotel, 5/7/1954, Correspondence "W," 1952–1962, box 2, Bunge Papers. For an example of his refusal to provide details, see Bunge to Howard Gaudin, 3/2/1954, Correspondence "G," 1950–1964, box 1, Bunge Papers.

91. Bunge to Anna Bunge, 12/22/1953 and 2/23/1954, Correspondence "B," 1949–1964; and Bunge to John O. Haman, 2/5/1954, and Bunge to William Harness, 2/16/1954, Correspondence "H", 1948–1964, box 1, Bunge Papers.

92. Charles Ernshaw to Bunge, 12/21/1953, Correspondence "E," 1950–1964, box 1, Bunge Papers. The name of this correspondent has been changed to protect patient confidentiality.

93. Bunge to Charles Ernshaw, 2/10/1954, and Charles Ernshaw to Bunge, 2/15/1954, Correspondence "E," 1950–1964, box 1, Bunge Papers.

Bunge evidently consulted every eye specialist he could find. On the advice of an eye doctor at the University of Iowa, he wrote back to ask the father whether the mother had experienced any illnesses during pregnancy, because some maternal infections during the first trimester, most notably German measles, could lead to infant blindness. Bunge's Iowa colleague was disinclined to attribute the birth defect to the sperm, but Bunge was not yet convinced. He also contacted one of his old professors at the University of Michigan, seeking his opinion.[94]

While Bunge fretted, the child's condition deteriorated. She began to suffer seizures, which frightened her parents and led to her hospitalization. By March, the combination of symptoms pointed to congenital toxoplasmosis, a disease caused by a parasitic infection of the mother during pregnancy. Untreated since December, the disease was "far advanced" and there was "considerable damage," according to the father's report.[95]

The diagnosis was terrible news for the parents. Their daughter, were she to survive, might be blind and developmentally disabled. The prognosis was "doubtful."[96] But the attribution of the problems to an infection must have been a great relief to the researchers, even as Bunge grieved for the family, whom he knew personally. The baby's problems seemed to have no connection to her unusual origins. As Bunge said in a private letter to the Michigan ophthalmologist he consulted, the news "takes us off the hook a little bit." In the clinical report that was eventually published, describing the inseminations and pregnancies that resulted in two baby girls and one baby boy, all babies were described as "normal." No one was to know of the toxoplasmosis.[97]

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94. Bunge to Charles Ernshaw, 2/18/1954, Correspondence "E," 1950–1964, box 1, Bunge Papers; Bunge to Harold F. Falls, 2/18/1954, Correspondence "F," 1949–1964, box 1, Bunge Papers.

95. Charles A. Branthaver to Bunge, 3/11/1954, Correspondence "B," 1949–1964, box 1, Bunge Papers; Charles Ernshaw to Bunge, 2/24/1954, Correspondence "E," 1950–1964, box 1, Bunge Papers.

96. Charles Ernshaw to Bunge, 2/24/1954, Correspondence "E," 1950–1964, box 1, Bunge Papers.

97. Bunge to Harold F. Falls, 3/8/1954, Correspondence "F," 1949–1964, box 1, Bunge Papers; Bunge et al., "Clinical Use," 527–28. In 1962 Bunge did tell Sophia Kleegman, a fertility specialist in New York City with whom he had been corresponding since the early 1950s, that one of the 15–20 babies from

After the drama of February and March, Bunge's plans suffered a further blow in April, while the paper describing the births was still before the prize committee. The *Gazette* reporter had found someone to confirm that the awaited children had arrived. On April 9, 1954, the Sunday edition of the *Cedar Rapids Gazette* published its bold headline, referencing the news reports from 1951 predicting posthumous fatherhood. The lengthy article, covering the width of the front page, was illustrated by photographs of Bunge and Sherman. The actual news content, however, was quite limited. The reporter had gleaned that the three births announced in *Nature* "had occurred" and that the progeny were "normal." He did not know dates, sexes, or weights. Both Bunge and Sherman refused to comment for the story, although somehow the reporter learned that the results were being entered in a medical competition. Most of the article was drawn from previously published articles and Sherman's dissertation, describing the freezing experiments. The article described a "bank" at the university that held semen from childless men, which, the reporter speculated, would be used to inseminate their wives. It reiterated the notion that this meant that fatherhood after death was now possible, while quoting an earlier refusal by Bunge to comment on the "sociological aspects" of the project: "I don't want to get into the ideology of it. We are conducting the study, and that's it."[98]

The story was not the sober, scientific announcement Bunge had been planning for a national audience of doctors who specialized in urology and infertility, after a committee of his peers had reviewed his data and found them prizeworthy. It was sensationalist, emphasizing parenthood beyond the grave, and it caused a sensation. As the wire services picked up the story, Bunge heard from colleagues from California to New York who had seen press reports.[99] Bunge described himself as "down-

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frozen sperm born since 1953 had suffered toxoplasmosis. Bunge to Sophia Kleegman, 2/21/1962, Correspondence "K," 1952–1962, box 2, Bunge Papers.

98. *Cedar Rapids Gazette,* 4/9/1954.

99. Sophia Kleegman (NY) to Bunge, 4/11/1954, Correspondence "K," 1952–1962, box 2, Bunge Papers; John Hutch (CA) to Bunge, 4/19/1954, Correspondence "H," 1948–1964, box 1, Bunge Papers (describing "nice blow" in Bay Area papers).

right ashamed" when the article appeared. He told one friend who had written to congratulate him that the article was "full of crap."[100] The resulting attention was exactly what he had feared.

> Publicity and attitudes of some people toward this research has been distressing at times to me. While I believe with all my heart that it is a good project, it distresses me that at times all of the uncalled-for confusion comes tumbling down on my head. The misquotations in the newspapers and their subsequent effect on some of my colleagues produced a considerable area of misunderstanding.[101]

The American Society for the Study of Sterility wanted nothing to do with such sensationalism. As Bunge described it, "there was quite a tangle" with the society. The prize competition was cancelled for 1954—the prize committee unanimously agreed that "none of the manuscripts submitted merited the award." Bunge did not travel to the annual meeting in San Francisco to present his paper. Further, he also cancelled his long-planned appearance at the American Urological Association meeting in New York City, explaining to a colleague that the press attention had caused him to withdraw. The university information service issued a statement that the researchers would not make any public presentation of their work.[102]

The world would have to wait for the publication of the clinical article, originally written for the now-cancelled prize competition. Eventually, the article appeared in *Fertility and Sterility*. The *Gazette*, still covering the story, ran another front-page story in December, titled "Millions of Childless—A New Hope," again without any input from the researchers.[103] Even a year later, Bunge remained shy of the press, refusing to speak to reporters and declining to write a popular article about his work. He explained, "We have sort of hidden our heads on making any popular progress report on our frozen semen project. There

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100. Bunge to John O. Haman, 11/18/1954, and Bunge to John Hutch, 4/23/1954, Correspondence "H," 1948–1964, box 1, Bunge Papers.

101. Bunge to Virginia Struermer, 7/29/1954, Correspondence "S," 1952–1963, box 2, Bunge Papers.

102. Bunge to Blake Talbot, 7/1/1954, Correspondence "T," 1953–1965, box 2, Bunge Papers; Herbert H. Thomas to Bunge, 7/12/1954, Correspondence "T," 1953–1965, box 2, Bunge Papers; *Cedar Rapids Gazette*, 6/17/1954.

103. *Cedar Rapids Gazette*, 12/11/1954.

was a deplorable amount of adverse publicity connected with the scientific publications."[104]

AT MID-CAREER, on the cusp of becoming full professor, Bunge had courted fame—and found it not to his liking. The Iowa work had proven the viability of sperm banks, long considered a way of improving the human race, but Americans were not ready for sperm banks. It would be another two decades before the first commercial sperm banks would open.[105] In the interim, probably fewer than ten universities maintained frozen-sperm collections.[106] Bunge deliberately withdrew from the frontlines of reproductive medicine as too controversial, a move that allowed the history-making Iowa babies to fall into popular obscurity.[107]

Bunge's public silence did not signal the complete disappearance of the Iowa sperm bank. An unnamed doctor told the persistent *Gazette* reporter in July 1954 that research into the problem of sterility would be continuing at the medical school. By March 1955, there had been nine pregnancies from frozen donor sperm at the University of Iowa fertility clinic. Disappointingly, those nine pregnancies had resulted after 26 attempts, a rate of success lower than that of donor insemination using fresh sperm. Eight of the women who had failed to conceive using frozen donor sperm subsequently conceived using fresh donor sperm.

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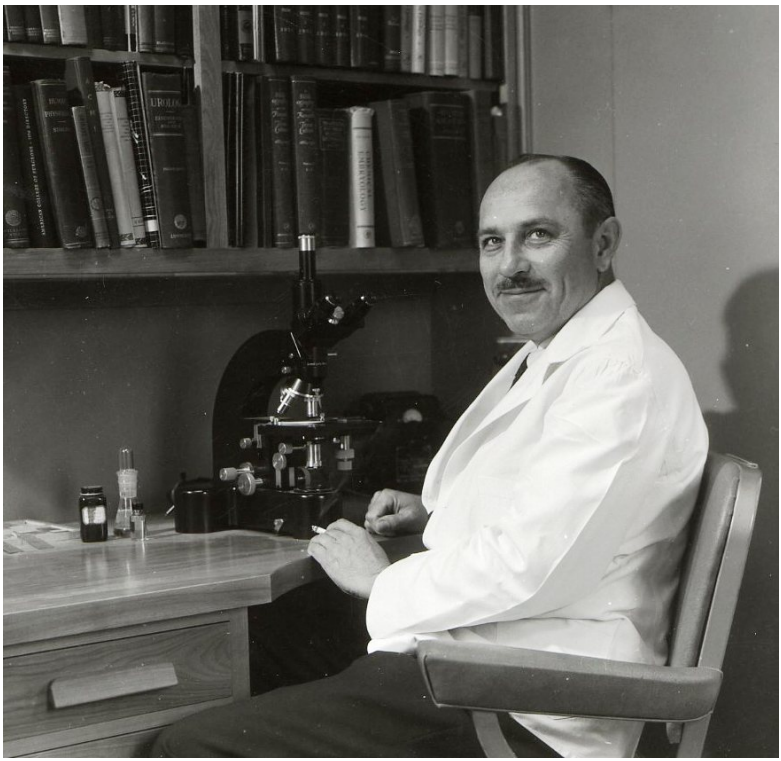
104. Bunge to A. R. Michaelis, date missing (in reply to a letter from Michaelis dated 3/7/1956), Correspondence "M," 1953–1965, box 2, Bunge Papers.

105. Daniels and Golden, "Procreative Compounds," 14–16.

106. Mark S. Frankel, "The Public Policy Dimensions of Artificial Insemination and Human-Semen Cryobanking," *Policy Studies in Science and Technology* 56 (Washington, DC, 1973), 1.

107. The Iowa research was never forgotten within the literature of reproductive medicine and has been continually cited. See, for example, Alan F. Guttmacher, "The Role of Artificial Insemination in the Treatment of Sterility," *Obstetrical and Gynecological Survey* 15 (1960), 767–85; G. W. Matheson, L. Carlborg, and C. Gemzell, "Frozen Semen for Human Artificial Insemination," *American Journal of Obstetrics and Gynecology* 104 (6/15/1969), 495–501; R. G. Polge, "Current Status of the Preservation of Semen and Embryos," *Proceedings of the Royal Society of Medicine* 69 (1976), 560–62; B. A. Keel, B. W. Webster, and D. K. Roberts, "Effects of Cryopreservation on the Motility Characteristics of Human Spermatozoa," *Journal of Reproduction and Fertility* 81 (9/1/1987), 213–20; and Ying Song, Randy Sharp, Fenghua Lu, and Maliha Hassan, "The Future Potential of Cryopreservation for Assisted Reproduction," *Cryobiology* 60 Supp. 1 (2010), S60–S65.



Dr. Raymond Bunge in 1957. From F. W. Kent Collection, University Archives, University of Iowa Libraries.

By November 1, 1954, the clinic doctors had decided that for donor insemination, fresh semen was preferable. According to Bunge's reckoning, by 1962 only about 15 to 20 babies had been born from frozen Iowa sperm since 1953, indicating that very few pregnancies were initiated with frozen sperm after 1954. Some of those babies may have been born elsewhere.[108] Although at first, in the aftermath of the controversy, Bunge declined all requests to ship frozen sperm, by 1963 he was willing to do so. He told a doctor from a small town who inquired about banked sperm as a solution to the difficulty of recruiting an anonymous

108. *Cedar Rapids Gazette*, 7/4/1954; Keettel et al., "Report of Pregnancies," 104; Bunge to Sophia Kleegman, 2/21/1962, Correspondence "K," 1952–1962, box 2, Bunge Papers.

local donor that he had in the past occasionally shipped specimens by air freight.[109] The sperm bank was quietly maintained, but was not a significant part of fertility treatment, either for husband or donor insemination.

After 1954 Bunge did not seek to capitalize on his participation in this history-making first by continuing to work in assisted conception. He returned to his research on urinary cancers, published on the biochemistry of fresh sperm, and developed a new research agenda related to intersex persons.[110] Through the 1950s Bunge occasionally mentioned in private correspondence that he continued to research concentrated frozen semen as an alternative to fresh semen for artificial insemination by husband, but he did not publish any further results, aside from one article in the *Journal of Urology* in 1960.[111]

On the other hand, Sherman, the young scientist whose experiments had initially intrigued Bunge, saw no reason to repudiate his successful dissertation research or to keep quiet about the preservation of sperm by freezing as he developed his scientific career. Instead, he devoted considerable professional energy to ensuring the eventual development of sperm banks as viable, publicly accepted institutions. Turning down opportunities to return to the East Coast, in 1958 Sherman accepted a faculty position in the Department of Anatomy at the University of Arkansas medical school, and remained there for the duration of

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109. Bunge to John Lingenfelder, 3/5/1956, and Bunge to Everett M. Laury, 5/21/1960, Correspondence "L," 1952–1962, box 2, Bunge Papers; Bunge to Harold B. Stout, 4/16/1963, Correspondence "S," 1952–1963, box 2, Bunge Papers.

110. See, for example, R. G. Bunge, "Cyto-Dynamic Properties of Urinary Neoplasms. V. Cultivation In Vitro of Transitional Cell Epithelium," *Journal of Urology* 73 (Jan. 1955), 101–2; R. G. Bunge and J. T. Bradbury, "Genetic Sex: Chromatin Test versus Gonadal Histology," *Journal of Clinical Endocrinology and Metabolism* 16 (Aug. 1956), 1117–19; R. G. Bunge and J. T. Bradbury, "Male Intersex with Ambiguous External Genitals and Well-Developed Muellerian Elements: A Case Report," *American Journal of Obstetrics and Gynecology* 80 (July 1960), 76–79; R. G. Bunge, "Two Types of Intersexuality," *Southern Medical Journal* 58 (Aug. 1965), 980–84; and K. H. Moon and R. G. Bunge, "Observations on the Biochemistry of Human Semen. I. Fructose," *Fertility and Sterility* 19 (March–Apr. 1968), 186–91.

111. Bunge to Harold Lamport, 9/21/1956, Correspondence "L," 1952–1962, box 2, Bunge Papers; R. G. Bunge, "Further Observations on Freezing Human Spermatozoa," *Journal of Urology* 83 (Feb. 1960), 192–93.

his career. He established and maintained a sperm bank at the university hospital, developed improved freezing techniques, earned accolades as a teacher, and continued his research into cryobiology. By 1967, he had received his own promotion to full professor. Sherman became a charter member of the Society for Cryobiology (founded in 1964) and the American Association of Tissue Banks (founded in 1976) and drafted the first certification standards for frozen human sperm banks.[112]

Through the 1960s, however, doctors continued to view the use of frozen-thawed sperm as experimental.[113] Despite the appearance of the first commercial sperm banks offering sperm storage services to men in the 1970s, frozen sperm would not become a significant part of reproductive medicine until the 1980s. As the AIDS epidemic began, the medical community came to understand that the HIV virus was transmitted in human semen, and that there could be a significant time lag between infection and a positive HIV test. There was now a strong medical reason to prefer frozen semen for donor insemination, as a donor could be retested for HIV some months after donation and before the semen was used, greatly reducing the risk of transmission of HIV.[114] Sherman was active in formulating and promoting a recommendation that doctors, who had been using fresh semen in 80 percent of donor inseminations, switch to frozen semen only, and from 1988 to 1992 he acted as an adviser to the Food and Drug Administration about AIDS and cryobanking.[115] He repeatedly published review articles summarizing the state of semen cryobanking for international medical and scientific audiences, and wrote some of the first histories of sperm banking.[116]

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112. Maravetz, "Baby-Making Breakthrough," 30; Sherman interview.

113. Finegold, *Artificial Insemination,* 14–15; J. K. Sherman, "Synopsis of the Use of Frozen Human Semen since 1964: State of the Art of Human Semen Banking," *Fertility and Sterility* 24 (1973), 397, 398–99.

114. Jerome K. Sherman, "Frozen Semen: Efficiency in Artificial Insemination and Advantage in Testing for Acquired Immune Deficiency Syndrome," *Fertility and Sterility* 47 (1987), 19–21.

115. Ibid., 19; Sherman CV.

116. See, for example, J. K. Sherman, "Research on Frozen Human Semen: Past, Present, and Future," *Fertility and Sterility* 15 (1964), 485–99; idem, "Synopsis," 397–412; and "Cryopreservation of Human Semen," in *Techniques of*

Dr. Jerome Sherman at work in 1971 at the University of Arkansas. Image courtesy of the UAMS Library Historical Research Center, Little Rock, Arkansas.

Despite the work that Sherman performed over a half-century to develop and promote sperm banks, decades elapsed between the Iowa babies as living proof of the concept and its acceptance. Frozen semen repositories may have been possible, but they were not desirable until assisted conception became more frequently used and accepted as a positive intervention. With each reemergence of the "test tube baby"—in the 1930s, the 1950s, and the 1970s—the medical and social landscape had changed, requiring Americans to recalculate the benefits and risks of these new conceptions. After 1953 the persistent per-

Human Andrology, ed. E. S. E. Hafez (New York, 1977), 399–420. Sherman's publications are listed in full in Sherman CV.

formance of artificial insemination with both fresh and frozen sperm supported a shift in acceptance of the practice. Even before Louise Brown made front-page news, a doctor who estimated that he performed 40 to 50 artificial inseminations per week in his New York fertility clinic in the early 1970s thought that "the repellant connotations of artificial insemination are almost nonexistent now." Sherman agreed, calling donor insemination a "widely accepted medical practice" by 1973.[117]

When Louise Brown's arrival proved the possibility of a new variant of assisted conception, even the reiteration of the threatening aspects of test tube babies in public discussions could not keep couples from clamoring for technical assistance in conception or doctors from rushing to open IVF clinics in response to this demand.[118] The first IVF conceptions were performed using fresh semen from the intended father and an egg from the intended mother, but the technique could also be used with donor gametes. As the assisted reproductive industry developed in the wake of enthusiasm for IVF and after the emergence of AIDS made fresh semen medically risky, the sperm bank found a place as part of that industry, providing frozen donor sperm to women seeking pregnancy in nontraditional ways.

IOWA, the perennial "middle land," once again proved a bellwether at mid-century.[119] The Iowa researchers exemplified the trend toward offering more medical assistance to the infertile. Bunge and Sherman, surrounded by an agricultural culture, did not hesitate to adapt animal husbandry techniques to the clinic in pursuit of a new type of test tube baby. Yet test tube babies were not acceptable to most Americans regardless of geography. Public discussions of test tube babies brought intense public interest and criticism in Iowa, as elsewhere. Criticism had followed Frances Seymour in 1934 when she went public with her

117. D. Rorvik, "The Embryo Sweepstakes," *New York Times Magazine*, 9/15/1974, 17, as quoted in Phillip Reilly, *Genetics, Law and Social Policy* (Cambridge, MA, 1977), 191; Sherman, "Synopsis," 401. For a contrary opinion, see Marsh and Ronner, *The Empty Cradle*, 227.

118. Marsh and Ronner, *The Empty Cradle*, 239–41; May, *Barren in the Promised Land*, 217.

119. The phrase is from Dorothy Schwieder, *Iowa: The Middle Land* (Ames, 1996).

artificial insemination practice, and it followed Bunge and Sherman in 1954. An Iowa legislator condemning frozen sperm as "pagan"[120] was expressing a lay person's version of the distaste expressed by the physicians of the American Society for the Study of Sterility, who found frozen-sperm babies too controversial to be prizeworthy. Despite this widespread distaste, Iowa couples who came to the university's fertility clinic for help were willing to try the new technique. As Iowans both embraced and rejected this advance, they reflected the perspectives of the nation.

For the next few decades, Iowans also used a strategy to address this ambivalence that reflected national practice, quietly keeping the sperm bank in operation at the university hospital and continuing to offer artificial insemination to patients while avoiding publicity. During the 1970s, however, Iowans once again began to discuss and celebrate frozen sperm. As Bunge neared retirement and as sperm banking became mainstream, he began to speak publicly about the Iowa test tube babies. In 1975, the year before his retirement, the university newspaper, the *Daily Iowan*, sought him out and published a full-page spread trumpeting "the urologist as superstar, trailblazing with gusto." Bunge told the student interviewer about how one of those first three patients was delayed by a blizzard on the day she was scheduled to receive frozen sperm. By 1977, the *Daily Iowan* described Bunge as a "pioneering urologist," and in 1978, the year Louise Brown was born, he was in the paper as "still ingenious" at 70.[121] Once sperm banks were well established in the 1990s, the University of Iowa also sought to advertise Sherman's work, highlighting him as an influential alumnus. The alumni magazine made him the subject of a cover story in 1998, providing an account of his "baby-making breakthrough" that explained how the "father of semen banks" did his pioneering work at the University of Iowa. In 2006 Sherman received a Distinguished Alumni Award.[122] As test tube babies are no longer

120. Maravetz, "Baby-Making Breakthrough," 30.

121. *Daily Iowan*, 7/9/1975, 10/6/1977, 7/7/1978.

122. Maravetz, "Baby-Making Breakthrough," 29; www.iowalum.com/daa/sherman.html (last viewed 8/21/2011).

specters of a dystopic future but cherished children all around us, Iowa is willing to remember and celebrate its early test tube babies and the first frozen-sperm bank.

Book Reviews and Notices

Birch Coulie: The Epic Battle of the Dakota War, by John Christgau. Lincoln: University of Nebraska Press, 2012. viii, 137 pp. Notes, index. $16.95 paper.

Reviewer Paul Beck is professor of history at Wisconsin Lutheran College. He is the author of *Inkpaduta: Dakota Leader* (2008); and *The First Sioux War: The Grattan Fight and Blue Water Creek, 1854–1856* (2004).

Over the years there have been a number of good general histories of the Dakota War of 1862. These include Kenneth Carley's *The Sioux Uprising of 1862*, C. M. Oehler's *The Great Sioux Outbreak*, and Duane Schultz's *Over the Earth I Come*. All are solid works that adequately cover the events of the war. What has been lacking are more in-depth studies of the various specific battles and events of the conflict. Recently, George Michno wrote *Dakota Dawn*, focusing on the first week of the outbreak; now John Christgau, better known for his books on sports and Japanese Americans during World War II, has added a study of the battle of Birch Coulie.

Birch Coulie is a slim volume, only 113 pages of text, and is intended for a general audience. There is a brief background to the war that is sparse and somewhat simplistic. The Dakotas are long-suffering and noble, while the whites are corrupt, hostile, and full of disdain for the Sioux. Once the conflict commences, Christgau tells the familiar tale of the war but barely mentions the atrocities committed by the Sioux during the first weeks of the uprising.

The author is on firmer ground when he discusses the individuals and events surrounding the battle of Birch Coulie. On August 31, 1862, General Henry H. Sibley sent a mixed force of infantry and cavalry, some 160 men, from Fort Ridgely to locate and bury civilians killed earlier by the Dakotas. Two days later that detail, led by Major Joseph Brown, encamped near Birch Coulie. On September 2, at dawn, the Sioux attacked the sleeping camp. Nearly half of the soldiers became casualities during the first minutes of the action. Christgau gives a lively, well-written account of the subsequent battle and the efforts to rescue the besieged soldiers.

In an attempt to write a modern interpretation of the battle, Christgau's use of certain terms in regards to the Dakotas are out of place.

Terms like *units, army, headquarters*, and *soldiers* are common military terms but do not reflect the warrior traditions of the Sioux.

The Dakota War also affected Iowa and its settlers. The Sioux considered Iowa part of their homeland; in 1857 the Spirit Lake Massacre occurred there; and during the uprising, war parties journeyed into Iowa, causing alarm. Later, in 1863 and 1864, soldiers from Iowa served on the punitive expeditions that fought against the Sioux in the Dakota Territory.

Birch Coulie is an entertaining study for those who are interested in the Dakota War. Although Christgau's bias and lack of understanding of the background of the conflict weaken the book, his relating of the battle itself is highly engaging.

Schooling the Freed People: Teaching, Learning, and the Struggle for Black Freedom, 1861–1876, by Ronald E. Butchart. Chapel Hill: University of North Carolina Press, 2010. xxii, 314 pp. Illustrations, tables, appendixes, notes, bibliography, index. $39.95 cloth.

Reviewer David J. Trowbridge is assistant professor of history at Marshall University. He is working on a book tentatively titled "Jim Crow in the Land of John Brown: African American Migration after Reconstruction."

"Behind the mists of ruin and rapine," W. E. B. Du Bois wrote of the post–Civil War struggle, "waved the calico dresses of women who dared. After the hoarse mouthings of the field guns rang the rhythm of the alphabet . . . they came seeking a life work in planting New England schoolhouses among the white and black of the South." With those words, Du Bois memorialized the Yankee schoolmarm in his 1903 classic, *The Souls of Black Folk*. Given the way those Northern teachers were vilified at the time he was writing, Du Bois offered a much-needed historical corrective that challenged the dominant image of the "meddling Yankee." According to Ronald Butchart, however, the modern memory of the noble Yankee schoolmarm has obscured a number of important truths about the history of Southern education during Reconstruction.

First and foremost, Butchart argues, less than one-fifth of the teachers of former slaves were Northerners. Even more surprising, Butchart argues that relatively few of those individuals were self-identified abolitionists. Southern black teachers were the first to establish schools for former slaves, the author continues, and those women and men remained the core of the faculty even as larger numbers of Northern and Southern whites took temporary positions as teachers in black schools. Butchart also identifies 200 Southern black

teachers who attended college or a teacher's academy. Armed with details such as these, the author challenges the notion that Southern black teachers were adjuncts to well-educated whites.

Schooling the Freed People begins with an introductory chapter that offers a historiographical overview and summary of the author's conclusions and statistical evidence. The next three chapters focus on the experiences and perspectives of African American, Southern white, and Northern white teachers. The fifth chapter moves beyond an investigation of personnel to survey the curricula of Reconstruction-era schools, identify their historical significance, and explore the issue of industrial education. The final chapter provides a detailed summary of the often violent opposition of white Southerners.

Butchart is critical of what he believes is the persistence of Dunning School interpretations about black education during Reconstruction. He cites historians' ''overreliance'' on the very accessible records of the American Missionary Association (AMA) as one of the reasons for the continuing assumption that most teachers were Northern whites. Butchart's conclusions are based on a database that he and a number of his students compiled. He calls the database The Freedmen's Teacher Project, and promises to publish it soon. This is perhaps the most exciting aspect of his research, as the database attempts to identify as much detail as possible about every person who taught in Southern black schools between the start of the Civil War and the end of Reconstruction.

The database is not without its shortcomings, which will lead thoughtful historians to challenge the precision of the author's conclusions. The database contains nearly 12,000 names—an impressive figure that the author believes represents about two-thirds of the total number of teachers. The problem, Butchart concedes and even chronicles in his helpful appendixes, is that many of the available records offer little demographical information about the teachers. In over half of the states, few or no records were available beyond the AMA records. In addition, many of the state records that were available did not record the teachers' race. It is not clear whether the author and his students used census records to acquire the missing demographic information. Although U.S. Census records for this time period are notorious for misrepresenting race, searching them would seem to be the next step toward the goal of increasing the quantity and accuracy of available data.

Butchart does well to overcome the numerous shortcomings of his sources, and his book offers a number of important contributions to the field. First, he challenges the assumption that Northern white

teachers who traveled to the South were primarily motivated by racial egalitarianism. Using a host of Northern teachers' letters, Butchart shows that they were much more likely to have been motivated by a desire to perform missionary work. Few mentioned racial uplift specifically, while some hinted that they simply needed a teaching job.

Another important contribution is the author's ability to bring to life the perspectives of numerous teachers with personal details. In the final chapter, Butchart does well to link Southern violence against Reconstruction with Southern violence against black schools and teachers. The final chapter is packed with examples of the social ostracism white teachers faced, as well as threats, kidnapping, shots fired, attempted lynchings, and even murder. Most of the violence, however, was directed against property. For example, Butchart relates the story of a black school in North Carolina that was destroyed only eight days after it opened. In each case, Butchart places white opposition against the backdrop of a determined black community. In this example, the school was rebuilt by former slaves in only four days.

The Land-Grant Act and the People's College: Iowa State University, edited by Allison H. Sheridan. Ames: Iowa State University, 2012. 172 pp. Illustrations, notes, appendixes, index. $38.00 cloth.

Reviewer Douglas Biggs is associate professor of history at the University of Nebraska–Kearney. He is the author of "Forging a Community with Rails: Ames, Iowa Agricultural College, and the Ames & College Railway, 1890–1896" in this issue of the *Annals of Iowa.*

Allison Sheridan's anthology of articles celebrates the sesquicentennial of the Morrill Land Grant Act of 1862. Among the nine articles exploring various aspects of how the Morrill Act affected Iowa State University (ISU) across time and space, readers will find several that sketch a broad, historical narrative from the founding of the college in 1858 to the present day. Other chapters interpret the campus and significant events in its history: the great milestones reached and achievements made at Iowa State since its founding in 1858; the building, use, and adaptive reuse of Morrill Hall; and the campus itself as a symbol of learning. Complementing these full-length pieces are a number of brief, page-length essays that reveal many details and interesting facts about ISU. The appendixes focus on the people of Iowa State, providing brief biographies of prominent Iowa State professors and graduates, and on the Morrill Act itself, including a transcription of the act in full. The scholarship is somewhat uneven, perhaps because the authors are a mix of professional historians, museum directors, and de-

velopment professionals at ISU, as well as President Gregory Geoffrey. Readers will appreciate the many historical photos illustrating chapters on the history of the university and of Morrill Hall in particular. On the whole, the book is a fine attempt to bring to a general audience the meaning of the Morrill Act within the context of Iowa State University. Those who seek information on the Morrill Act and how it pertains to Iowa State University will find what they seek in this volume.

Norwegians and Swedes in the United States: Friends and Neighbors, edited by Philip J. Anderson and Dag Blanck. St. Paul: Minnesota Historical Society, 2012. xv, 328 pp. Illustrations, graphs, tables, maps, notes, index. $24.95 paper.

Reviewer Marvin G. Slind is professor of history at Luther College. His research and writing have focused on Norewegian and Swedish immigration and ethnicity.

Although they share the Scandinavian Peninsula and have experienced many similar historical developments, Norway and Sweden are not identical. Even after Norway became part of the Swedish kingdom in 1814, they remained different in many ways. When thousands of Norwegians and Swedes emigrated to America in the late nineteenth century, they brought many of those differences with them. They did not create a single Scandinavian American culture, but instead developed rather separate Swedish American and Norwegian American societies. Those overlapped in many areas, thus representing a degree of Scandinavianism, yet they were not identical. *Norwegians and Swedes in the United States: Friends and Neighbors*, edited by Philip J. Anderson and Dag Blanck, examines many of their similarities and differences.

In 2007 the Swenson Swedish Immigration Research Center at Augustana College, Rock Island, Illinois, hosted a conference titled "Friends and Neighbors? Swedes and Norwegians in the United States." That conference served as the basis for this collection of essays. As the titles suggest, the conference examined whether or not relations between Norwegian and Swedish immigrants were indeed friendly; the removal of the question mark in the book's title indicates that the answer to that question was generally positive.

Anderson and Blanck have collected 17 essays that cover a broad range of Norwegian and Swedish American society. There are also a few references to Danes, Finns, and Icelanders, but the focus is overwhelmingly on Swedes and Norwegians. The book is organized into four broad categories: Context, Culture, Conflict, and Community.

Blanck himself offers the first essay, in which he examines broad patterns of interaction between Swedes and Norwegians; that essay

thus serves as an introduction to those that follow. The other essay in the "Context" section offers a general comparison of the two groups in America; in many ways, their characteristics represent the societies the immigrants left behind. Following these two broader overviews, the essays in the "Culture" section examine more specific topics, including cultural organizations, language, literature, historical studies, and humor.

The tensions surrounding Norway's break from Swedish rule in 1905 are the most obvious evidence of "Conflict," but religion (especially the synodical divisions within Norwegian and Swedish Lutheranism) was also a major cause of disagreement. Two of the essays in that section examine aspects of the 1905 crisis. The third guides the reader through the extremely complicated maze of Norwegian and Swedish Lutheran synods and church reorganizations, and the fourth discusses Norwegian American Lutheran responses to a controversy surrounding the teaching of evolution in Minnesota public schools.

The six essays in the "Community" section focus on even more specific subjects. These include the character of immigration among Swedish and Norwegian engineers and architects and the experiences of Swedish American students at a Norwegian American college. Settlements on Lake Superior's North Shore and a Minnesota town that was home to significant numbers of both Swedes and Norwegians are the focus of two individual studies. The final two essays examine Scandinavian American political activities in the Twin Cities and "Scandinavianism" in Montana and Utah, the latter being primarily related to Latter-Day Saint (Mormon) emigration.

Taken individually, some of these essays are undoubtedly too narrowly focused for readers who are not specialists in Scandinavian immigration history. However, as organized in this work, they form a coherent survey of a number of important developments in Scandinavian America. There are a few studies of specific locales in Minnesota, but most of the essays deal with broader topics and thus serve as case studies that are representative of developments around the nation, and particularly in the upper Midwest.

The list of authors includes scholars from both sides of the Atlantic, representing both Norwegian and Swedish perspectives (as well as one author from Denmark). In addition to well-established academics, there are also younger specialists who bring new perspectives and emphases. This bodes well for the future of Scandinavian studies, as the work of these younger scholars should continue to deepen our understanding of Scandinavian American history.

Winning the West for Women: The Life of Suffragist Emma Smith DeVoe, by Jennifer M. Ross-Nazzal. Seattle: University of Washington Press, 2011. xv, 256 pp. Illustrations, appendix, notes, bibliography, index. $26.95 paper.

Reviewer Kathleen M. Green is professor of history at Morningside College. Her research and writing have focused on woman suffrage and temperance.

Winning the West for Women is the first full-length scholarly study of the life of suffragist Emma Smith DeVoe. Jennifer M. Ross-Nazzal has uncovered the forgotten career of a woman who was "one of the country's most celebrated suffragists of her time" (12). Ross-Nazzal argues convincingly that DeVoe made a vital contribution to the woman suffrage movement on both the state and national levels. While concentrating on DeVoe, this study reaffirms the important role western women played in the suffrage struggle.

Ross-Nazzal has done the hard work of retrieving new primary sources from dozens of research collections and local newspapers scattered all over the country. By carefully analyzing the sources and placing DeVoe's actions and attitudes in a cultural and political context, Ross-Nazzal develops a complex and comprehensible narrative. Throughout the biography, Ross-Nazzal recognizes DeVoe's strengths as an effective campaigner and an adaptable strategist. Readers of the *Annals of Iowa* will find that DeVoe learned her craft in South Dakota and Iowa. During the 1890 South Dakota campaign, Susan B. Anthony worked with DeVoe on her speaking and organizational skills. Ross-Nazzal finds that DeVoe "played a much larger role in shaping the South Dakota campaign than historians and suffragists have given her credit for" (37). In 1892 Carrie Chapman Catt hired DeVoe to work in Iowa. That experience "helped to establish her national reputation as an effective fundraiser" (71). When she "spearheaded the Woman's Day and its activities at the South Dakota state fair held in Aberdeen," DeVoe introduced a model activity to the rural Midwest (71). The Iowa Woman Suffrage Association successfully adapted the tactic of a Woman's Day at the Iowa State Fair.

Ross-Nazzal courageously confronts controversial issues and divisions in the suffrage movement. She uses DeVoe's perspective to interweave disagreements over strategy, money, and leadership into the narrative. She explains why western women like DeVoe and Abigail Scott Duniway preferred the "still-hunt" strategy rather than an eastern-style political campaign (115). Yet Ross-Nazzal finds DeVoe's tactics flexible and adaptable enough to work briefly with Alice Paul. As a result of chronic financial troubles, DeVoe was paid for much of her suffrage work, which led her detractors "to question her morals and

commitment to suffrage" (7). Disagreements over tactics, leadership style, and money created the little-known but fascinating political power struggle between Emma DeVoe and May Arkwright Hutton over control of the Washington Equal Suffrage Association (125–30). That political struggle gives readers an insider's view of the diversity of opinion and activities on the state level.

This study provides more evidence of how little the National American Suffrage Association understood western conditions. After DeVoe led Washington suffragists to victory in 1910, she established the National Council of Women Voters as an independent organization of western states. Ross-Nazzal asserts that historians "have failed to understand just how important the council's leadership was to the passage of the Nineteenth Amendment" (7), and she concludes that "regionalism . . . played a role in the shaping of battle plans to win passage of a suffrage amendment" (140).

This skillfully crafted and clearly written biography successfully explores the woman suffrage movement through the life of Emma Smith DeVoe. From her days in Dakota Territory through her years of service on the Republican National Committee, DeVoe worked tirelessly to gain political rights for American women. Ross-Nazzal has done a fine job of recovering her voice and has given her an important place in the history of woman suffrage.

New on the Shelves

"New on the Shelves" is a list of recent additions to the collections of the State Historical Society of Iowa. It includes manuscripts, audio-visual materials, and published materials recently acquired or newly processed that we think might be of interest to the readers of the *Annals of Iowa.* The "DM" or "IC" at the end of each entry denotes whether the item is held in Des Moines or Iowa City.

Manuscripts

Calvary Baptist Church, Des Moines. Records. 10 ft., 1872–2012. Records of a church that served the east Des Moines community for 140 years from its location near the state capitol grounds. In addition to regular congregational activities, the church engaged in missionary work abroad and community activism and social justice initiatives locally. Materials include minute books, reports, newsletters, and scrapbooks. DM.

Steffen, Earnest W. Correspondence. ¼ ft., 1956–1975. Letters written by Earnest W. Steffen, an Iowa folk artist who sketched and painted birds. Letters describe activities in support of his art, including exhibitions and visits to national parks and preserves to observe his subjects in their natural habitats. DM.

Audio-Visual

Aging and Gender Studies. Oral interviews. ¼ ft., 2005. Content notes from interviews conducted with senior members of Iowa's Lesbian/Gay/Bi-Sexual/Transgender community for the State Historical Society of Iowa's exhibit, "Growing Old with Dignity and Grace." [Audio of interviews available pending reformatting.] DM.

Civil War. Photo album (31 cartes-de-visite & tintype portraits), ca. 1862. Portraits of soldiers who served with the 8th Iowa Volunteer Infantry and some of their commanding officers. DM.

Peterson, Teckla. 38 photographic postcards; 17 lithographic postcards, ca. 1910. Iowa postcards from album compiled by Teckla Peterson, a Swedish-American resident of Muchakinock and Buxton, Iowa. The largest portion of the views are of Buxton (including Monroe Mercantile Company, Coal Mine No. 10, and West Swedish Church), Albia, Dexter, and Hiteman. Of note among the views from 13 additional communities are a series showing bridge construction at Iowa Falls and a rare main street view of Lakonta (Truax), a coal-mining community near Buxton. DM.

Twombly, Voltaire P. Photo album and scrapbook. ¼ ft., ca1870–1998. Photo album and scrapbook documenting Iowa Civil War medal of honor recipient Voltaire P. Twombly, compiled by his granddaughter Ruth Jeffries. DM.

Published Materials

America's Women in the Revolutionary Era: A History through Bibliography, by Eric G. Grundset et al. Washington, DC: National Society Daughters of the American Revolution, 2011. 3 vols. DM, IC.

Caddock: Walnut's Wrestling Wonder, by Mike Chapman. Newton: Culture House in cooperation with the City of Walnut, 2011. 88 pp. IC.

A Curious Iowa Connection: Vinnie Ream and the Statue of Samuel Kirkwood, by Paul C. Juhl. Iowa City: Brushy Creek Publishing, 2011. 71 pp. IC.

Depots on the Minneapolis & St. Louis Railway, by Dennis Holmes. Ethel, MO: Chicago & North Western Historical Society, 2009. 104 pp. IC.

E. A. Kurtz: The Reluctant Pastor, by Harold P. Kurtz. Minneapolis: Quill House Publishers, 2011. 174 pp. *Biography of a German immigrant Lutheran pastor in Sterling, Illinois, and Avoca and Dows, Iowa, in the late nineteenth and early twentieth centuries.* IC.

Early Studies of Legionnaires' Disease in Iowa, by Charles M. Helms. [Iowa City: University of Iowa Hospitals and Clinics, 2012.] 14 pp. IC.

Ethnic Textile Traditions of Iowa Immigrant and Native Populations. Ames: Textiles and Clothing Museum, Iowa State University, 2009. 88 pp. DM, IC.

Favorite Recipes of Iowa: Meats Edition, Including Poultry and Seafood. Louisville, KY: Favorite Recipes Press, 1966. 124 pp. IC.

The Girl on a Horse, by Fred Wilson. Spirit Lake: Lake Printing Co., 1990. 215 pp. *Reminiscences of life in the Okoboji Lakes region through most of the twentieth century.* IC.

Haunted Iowa City, by Vernon Trollinger. Charleston, SC: Haunted America, 2011. 109 pp. IC.

Hidden in Plain View: The Secret Story of Quilts and the Underground Railroad, by Jacqueline L. Tobin and Raymond G. Dobard. New York: Doubleday, 1999. x, 208 pp. DM, IC.

Illustrated Review Showing Development of the State of Iowa. Chicago: Earl J. Robinson, [1915?]. 192 pp. DM, IC.

"Inherently Bad, and Bad Only": A History of State-Level Regulation of Cigarettes and Smoking in the United States since the 1880s, by Marc Linder. Iowa City: [University of Iowa], 2012. IC. Accessible online at http://ir.uiowa.edu/cgi/viewcontent.cgi?article=1001&context=books

Life and Death on the Prairie, by Stephen Longmire. Staunton, VA: George F. Thompson Publishing in association with the Faulconer Gallery at Grinnell College and the University of Iowa Museum of Art; distributed by University of Wisconsin Press, 2011. x, 149 pp. *A photo essay about Rochester Cemetery.* IC.

Lit by the Sun: The Art and Artists of the Hotel Pattee, by Lela Gilbert; photography by Ellen Bak. Portland, OR: Carpe Diem Books, 2001. 160 pp. DM, IC.

Millionaires in the Cornfields: The Glory Days of the National Dairy Cattle Congress, by Norman E. Nabholz. [West Union: Nabholz Farm, 2010?] 262 pp. IC.

A Model of Correctional Leadership: The Career of Norman A. Carlson, by Clemens Bartollas. Alexandria, VA: American Correctional Association, 2010. xv, 233 pp. *Carlson, who grew up in Sioux City, earned a master's degree from the University of Iowa, and began his career as a correctional officer at the Iowa State Penitentiary at Fort Madison, eventually rose to become director of the Federal Bureau of Prisons, 1970–1987.* IC.

The Mormon Trail: Historic Byway Inventory and Evaluation, by Design Data, Inc. and Tallgrass Historians L.C. [Ames: Iowa Dept. of Transportation], 1998. IC.

Prairie Oasis: The Railroads, Steamboats, and Resorts of Iowa's Spirit Lake Country, by Donovan L. Hofsommer. Des Moines: Waukon & Mississippi Press, 1975. 159 pp. DM, IC.

Signs of Their Times: Iowa Hometown Slogans, Photos, and Stories, by Sharon Schissel Lemke and Ann Ursula Loughlin. [Davenport?], 2006. 79 pp. IC.

"'Somos del Compo': Latino/a Gardeners and Farmers in Two Rural Communities of Iowa: A Community Capitals Framework Approach," by Diego Thompson. M.S. thesis, Iowa State University, 2010. 58 pp. IC.

Steamboats West: The 1859 American Fur Company Missouri River Expedition, by Lawrence H. Larsen and Barbara J. Cottrell. Western Lands and Waters Series 25. Norman, OK: Arthur H. Clark Co., 2010. 256 pp. IC.

Survey of Folklore Collections in the Upper Midwest. Madison, WI: Center for the Study of Upper Midwestern Cultures, 2006. 31 pp. IC.

Train to Nowhere: Inside an Immigrant Death Investigation, by Colleen Bradford Krantz. North Liberty: Ice Cube Press, 2011. 163 pp. *Investigation of the 2002 railcar deaths of 11 undocumented immigrants from Mexico and Guatemala whose bodies were discovered in Iowa.* IC.

Vignettes of an Anti-war Vet, by Lyle Tatum. Westmont, NJ, 1997. 20 pp. IC.

A Visitation of God: Northern Civilians Interpret the Civil War, by Sean A. Scott. New York: Oxford University Press, 2011. xii, 347 pp. IC.

West from Salt Lake: Diaries from the Central Overland Trail, edited by Jesse G. Petersen. Norman, OK: Arthur H. Clark Co., 2012. 328 pp. IC.

Contributors

DOUGLAS BIGGS is associate professor of history and associate dean of the College of Natural and Social Sciences at the University of Nebraska–Kearney. He received his Ph.D. from the University of Minnesota in 1996 in medieval English history. He has written extensively on the reigns of Richard II (1377–1399) and Henry IV (1399–1413) and is a fellow of the Royal Historical Society. This is his first foray into Iowa history.

KARA W. SWANSON is associate professor in the School of Law, Northeastern University, Boston, Massachusetts. She earned a B.S. in molecular biophysics and biochemistry from Yale University, an M.A. in biochemistry and a J.D. from the University of California at Berkeley, and completed her Ph.D. in the history of science at Harvard University. Her book-in-progress is a history of body banks in the twentieth-century United States, focusing on breast milk, blood, and sperm.

The State Historical Society of Iowa

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Marvin Bergman, editor
The Annals of Iowa
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